Section b, Mechanical Engineering.—Chairman: President Alexander C. Humphreys, Stevens Institute of Technology. Speakers: Professor A. Riedler, Königliche Technische Hochschule, Berlin; Professor Albert W. Smith, Leland Stanford, Jr., University.

Section c, Electrical Engineering.—Chairman: Professor Arthur E. Kennelly, Harvard University. Speakers: Signor G. Marconi, Italy; Professor Michael I. Pupin, Columbia University.

Section d, Mining Engineering.—Chairman: Mr. John Hays Hammond, New York City. Speakers: Professor Robert H. Richards, Massachusetts Institute of Technology; Professor Samuel B. Christy, University of California.

Section e, Technical Chemistry.—Chairman: Professor Charles F. Chandler, Columbia University. Speakers: Professor Otto N. Witt, Königliche Technische Hochschule, Berlin; Professor William H. Walker, Massachusetts Institute of Technology.

Section f, Agriculture.—Chairman: Honorable James Wilson, Secretary of Agriculture, Washington. Speakers: Professor Léon Lindet, National Agronomic Institute, Paris; Professor Liberty H. Bailey, Cornell University.

THE THIRTIETH GENERAL MEETING OF THE AMERICAN CHEMICAL SOCIETY.

The thirtieth general meeting of the American Chemical Society was held in Providence, R. I., during Tuesday, Wednesday and Thursday, June 21–23, the place of meeting being Rockefeller Hall, on the campus of Brown University. At the opening session President Wm. H. P. Faunce, of the university, delivered an address of welcome, and this was followed by a response on behalf of the society by its president, Professor A. A. Noyes. The members of the local section gave themselves without reserve to providing for the comfort of the visitors, and their hospitality received full appreciation. Luncheons were served in Sayles Memorial Hall on Tuesday and Wednesday by the courtesy of two local companies, T. P. Shepard & Co., and the Rumford Chemical Works. The University Club extended its house privileges to all members of the society during the entire meeting, and on Tuesday evening entertained them at a most enjoyable informal reception. On Thursday afternoon, the members of the local section invited the visitors to attend a Rhode Island clambake at the Pomham Club, on the shore of Narragansett Bay. This 'crowning event' of the meeting was closed by a series of impromptu speeches, when Professor J. H. Appleton, the chairman of the local committee, proved himself a very entertaining toastmaster.

In addition to the regular morning sessions, an open lecture was delivered on Wednesday evening by Dr. H. W. Wiley, of Washington. This was the first public announcement of the results obtained in his important series of experiments upon the effect of the food preservatives, boric acid and borax, on metabolism. A summary of these results appeared in all the leading newspapers in the issue of June 23.

At the close of the last session a hearty vote of thanks was extended to Professor Appleton and his associates and to the various local organizations by whom courtesies were shown to the visiting members. The list of manufacturing concerns that opened their doors to the various afternoon excursion parties is too numerous to be included here.

The number of members in attendance was 128, of whom 104 were visitors. The next meeting will be held in Philadelphia, beginning December 27.

REPORTS FROM INSTITUTIONS.

A new feature was the presentation of reports from various institutions upon the research work which has been in progress during the past year. Lack of space forbids the reprinting of these reports in full, and the following brief summaries, which may serve to give a general idea of the progress of such work, are by no means exhaustive. It should also be said, in justice to those who presented the reports, that some were made impromptu, in response to special request.

Harvard University.—Aromatic addition products, especially new derivatives of tetrabromorthoquinone. Detection and estimation of small quantities of arsenic and antimony in toxicological work. Dissociation of certain addition products, as phenoquinone, in benzene solution. Atomic weights of iodine, cadmium, sodium, etc. Decomposition of silver oxide above 300°. Conductivity of potassium iodide in melted iodine. Energy changes of iron and nickel. Study of amalgam cells. Study of specific heats of liquids by a new method. Continuations of certain former investigations.

Columbia University.—Various researches in physiological chemistry, some of which have already been published. Organic: On *m*-aminobenzonitrile. Extension of synthetic methods for the preparation of quinazolines. Physical: combination of a solvent with the ions. Dissociation of lead nitrate. Thermo-chemistry of electrolytic dissociation. Ionic equilibrium of solutions of potassium silver cyanide, etc. Industrial: Electrical preparation of metallic magnesium. Extraction of radioactive bodies from carnotite. Analytical: Reduction of lead from litharge in preliminary assays. A crucible charge for gold and silver in zinc ores. Determination of molybdenum in steel, etc. Separation of thorium from cerium, etc. Determination of nitrogen in organic compounds. Determination of formaldehyde.

Massachusetts Institute of Technology.—Physical Chemistry: Dissociation at high temperatures. Conductivity of fused electrolytes; also of very dilute solutions. Test of a method for determining absolute potential. Reaction between potassium sulphocyanate and mercuric sulphocyanate. Hydrolysis of ammonium sulphide. Dissociation relations of sulphuric acid as determined by comparative inverting power, etc. Industrial: Commercial preparation of chloroform from acetylene. Purification of low-grade rosins. Bleaching with sodium hypochlorite. Hydrocarbons in distilled wool grease. Organic: Systematic identification of nitrogen compounds. Experiments with a view to preparing a bivalent carbon compound.

University of California.—Gravimetric determination of free acids. Investigation of California petroleum, and also of tar from oil distillation. Action of nitrogen on various oxides in presence of carbon. Solubility of salts of boric acid in presence of salts of other acids. New method of extraction from sulphide ores. On the existence of ethers of fulminic acid. Chemical reactions of the cyanide process. Co-precipitation of gold and platinum with silver chloride. Constitution of *p*-nitroso compounds. Synthesis of acetylene derivatives.

Yale University.—Kent Laboratory: In addition to eleven papers already published, there are sixteen investigations, some of which are completed but not yet reported upon, while others are still in progress. Sheffield Laboratory: Work on double and triple salts. Heat of combustion of carbon from acetylene. Pyrimidine derivatives. Thiocyanates and isothiocyanates. Triazoles. Laboratory of Physiological Chemistry: Study of certain aspects of nutrition. Paths of excretion for inorganic compounds. Physiological chemistry of the compounds. Physiological chemistry of the invertebrates. Utilization of proteids.

University of Chicago.—Dissociation phenomena in the glycol and glycerin series. Relations between the forms of sulphur. Velocity of saponification of imido ethers. Stereoisomeric chlorimido derivatives and the Beckmann rearrangement. Constitution of purpuric acid.

Preparation of homologous alkyl isoureas. Ionization constants of phenolphthalein, and its use as an indicator. Relation of radium to uranium.

Johns Hopkins University.—Phenylsulphone-orthocarboxylic acid. Effect on zinc of dry hydrochloric acid dissolved in benzene. Clay mixtures and the burning of porous cells. Preparation of cells for osmotic pressure work. Electric combustion furnace. Depression of the freezing point in concentrated aqueous solutions. Conductivity of electrolytes in mixtures of alcohol and water. Decomposition products of sodamide; also its reactions with phosphorus pentachloride and with yellow phosphorus. Temperature coefficients of conductivity from 40° to — 40°. Decompositions of nitroso compounds. A step toward the synthesis of camphoric acid.

University of Wisconsin.—Influence of chemical reaction upon weight. Coloring matters of plants. Soap solutions. Phenoxozone compounds (effect of substitution on the ease of formation of condensation products). Effect of oxidizing agents upon the solubility of gold in various reagents. Formation of alkaline and silver tellurates, of chromium ammonium peroxides, etc. Atomic weight of selenium. Osmosis with solvents other than water and with various membranes.

Leland Stanford University.—Purification of feed waters, especially in arid regions. Spectroscopic study of some rare elements. Methyl amine as a solvent. Reactions in ammonia. Hydrochloric acid addition products of stannous chloride. Modification of freezing-point method for molecular weight determinations. Metastability in the case of sodium thiosulphate; also solubilities of the different forms.

University of North Carolina.—Investigations on thorium and certain of the rare earths; carolinium. Radio-active constituents of monazite sands. Action of radium emanations on minerals. New organic salts of neodymium. Strontium malate. The methoxy group in certain lignocelluloses. Action of bromine on trichlorethylidene diparanitrophenamine.

Verbal reports were also made by Professor Bancroft, representing Cornell University, and Professor Johnson, representing the University of Michigan.

PAPERS.

The following papers were read before the society:

The Ratio of Radium to Uranium in Minerals: Bertram B. Boltwood.

The investigation of a series of nine uranium minerals has led to the conclusion that the amount of radium present in any given mineral is proportional to the uranium content. This would seem to offer strong evidence of the truth of Rutherford's suggestion that radium is formed by the decomposition of uranium. The method employed for the quantitative determination of the radium depends on the measurement of the maximum or equilibrium quantity of emanation formed from the radium salts present.

The Qualitative Separation and Detection of the Group of Elements whose Oxides are Insoluble in Nitric Acid: Arthur A. Noyes.

An account of this work, which is not yet in final form, will be published later in the year.

Note on the Amount of Moisture which Phosphorus Pentoxide Leaves in a Gas: Edward W. Morley.

The author formerly found that the sum of the moisture left, and the phosphorus pentoxide absorbed, in a gas, is not more than a milligram in 45,000 liters. He now finds the phosphorus pentoxide alone to be one milligram in 45,000 liters. To the degree of approximation so far attained, therefore, it seems that the moisture left in a gas by phosphorus pentoxide is *nil*. A gas may be made as dry as the figures indicate, by passing at the rate of two liters an hour *through* 25 c.c. of phosphorus pentoxide. The difficulty often experienced in filling a glass apparatus with a perfectly dry gas is due to the wetting of the dried gas by the water persistently adhering to the surface of the glass.

Bromides of Ruthenium: JAS. LEWIS HOWE.

These compounds were prepared by the action of hydrobromic acid upon ruthenium tetroxide. Addition of alkali bromides gives brom-ruthenites of the formula $X_2'RuBr_5$, which, when boiled with dilute alcohol acidified with hydrobromic acid, give aqua brom-ruthenates, $X_2'Ru(H_2O)Br_5$. The latter form, on addition of bromine, the salts $X_2'RuBr_6$. All of these salts are analogous and similar to the corresponding chlorides.

Changes in the Composition of the Ferrocyanides of Cadmium, Zinc and Manganese after Precipitation: E. H. MILLER and M. J. FALK.

Several new double ferrocyanides of cadmium, ammonium and potassium were described. The investigation also showed that the precipitate formed in the ordinary titration of zinc in the presence of ammonium chloride is an ammonium potassium zinc ferrocyanide, and not $K_2Zn_3Fe(CN)_6$ as given heretofore.

Silica Determinations: HARRISON EVERETT ASHLEY.

The Atomic Weight of Beryllium: C. L. PARSONS.

An abstract of this paper has recently appeared in SCIENCE in a report of a meeting of the New York section (p. 923).

The 'Drop' Method for Surface Tension as a Means for Ascertaining the Molecular Weight in the Liquid State: J. LIVINGSTON R. MORGAN. (By title.)

The Constitution of the Brasses: WILDER D. BANCROFT.

Six sets of solid solutions crystallize from molten mixtures of copper and zinc. Below 400° only five of these are stable. The α crystals (100–63 per cent. copper at 400°) are yellow, the β crystals (54–51 per cent. copper) are reddish, while the other four series are silvery. Brasses containing 51–40 per cent. copper consist of a mixture of brittle silvery crystals and ductile reddish-yellow crystals. An alloy containing 43 per cent. of copper was shown in which the fracture was silvery, while the polished surface was yellow.

The Transport Number of Sulphuric Acid: O. F. TOWER.

Experiments were made with normal, one half normal, one fifth normal, one tenth normal, one twentieth normal and one fiftieth normal acid and at the temperatures 8°, 20° and 32°.

It was found that the transport number decreases with the concentration and is practically constant at the concentrations one twentieth and one fiftieth normal. The average value found at these concentrations was 0.180 at 20°. At other temperatures between 8° and 32° the following equation holds:

$$n_t = 0.18° + 0.0011\,(t - 20°).$$

The Hydration of Milk Sugar in Solution: C. S. HUDSON.

By determinations of the initial and final solubility of solid milk sugar hydrate and milk sugar anhydride, conclusions are drawn as to the state of hydration of milk sugar molecules in solution. The change in the hydration proceeds so slowly as to be accurately followed, and the results obtained by other methods are in entire agreement.

Migration of Colloids: W. R. WHITNEY and J. C. BLAKE. (By title.)

The Vapor Pressure of Sulphur at 100° C.: HIPPOLYTE GRUENER.

These determinations, in which carbon dioxide was passed over solid sulphur, resulted as follows:

With prismatic sulphur	0.007 mm.
With rhombic sulphur	0.0065 mm.

Although this value is so small, considerable amounts of sulphur pass over when water containing it in suspension is boiled.

Some Notes on Laurent Polariscope Readings: Geo. W. Rolfe and Chas. Field, 3d.

These rotation readings are about 0.2 per cent. lower than those given by the Lippich apparatus. The experiments of the authors indicate that this variation is not due to the imperfections of the polariscope, as asserted by some, but to the nature of the light used.

The Molecular Depression Constant of p-Azoxyanisol: H. Monmouth Smith.

This value has been determined at different times and stated variously to be 750, 654 and 545. A redetermination of this constant was made and a value of 563 obtained. Ketones were found to give an abnormal value 32 per cent. higher than the average found from other classes of compounds.

The Sulphates of Beryllium: C. L. Parsons.

Of those described, namely, $BeSO_4 \cdot 4H_2O$, $BeSO_4 \cdot 2H_2O$, $BeSO_4 \cdot 7H_2O$, $BeSO_4$, and certain basic sulphates, the first is comparatively stable in moist air, and the second in dry air. There is good evidence that the third does not exist, and the fourth could not be prepared by any methods used by the author. The basic sulphates are probably only solid solutions.

Turpentine and Colophonium of the Northern Pine and Douglas Fir: G. B. Frankforter. (By title.)

Metallic and Other Salts of Eugenol: G. B. Frankforter. (By title.)

The Wurtz Synthesis: James F. Norris. (By title.)

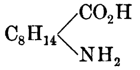
Strontium Malate: Alvin S. Wheeler and W. McKim Marriotte. (By title.)

The Oxidation of Phenylnaphthalene-dicarboxylic Acid: John E. Bucher.

The principal products obtained were diphenyltetracarboxylic acid, two isomeric oxal-diphenyltricarboxylic acids, and a very small quantity of *o*-benzoylbenzoic acid. In addition to these, a number of other acids were found whose constitution has not yet been determined.

The Decomposition of Nitroso Compounds: William A. Noyes and R. de M. Taveau.

From the compound



$$C_8H_{14}\begin{cases} CO_2H \\ NH_2 \end{cases}$$

four decomposition products have previously been described by one of the authors. By treatment of the nitroso derivative of the anhydride of this acid with sodium hydroxide and methyl or ethyl alcohol they have now obtained addition products of formaldehyde and acetaldehyde, respectively, with the nitroso compound less the nitroso group. The investigation will be extended to other nitroso compounds.

Substitution in the Aliphatic Series: A. Michael and H. J. Turner.

When bromine is forced to act upon propane, the effect is confined to the methylene group, while chlorine, which has more free energy, acts not only upon the methylene but also to a smaller extent upon the less susceptible methyl group. An analogous effect is observed in the case of hexane. Each halogen produces more of the secondary substitution product than of the tertiary, but the ratio of their amounts is 4:1 with bromine, and 3:2 with chlorine. Chlorine also yields a larger quantity of primary hexyl chloride than does bromine.

The Effect of Constitutive Influences upon the Additive Power of Carbonyl: A. Michael and H. J. Turner.

This was studied by observing the stability of the semicarbazones in the presence of acids of different strengths. The additive power of methyl butyl ketone is greater than that of acetaldehyde; of substituted acetoacetic ester, less than that of the ester.

The Carbon from Acetylene, the Fourth Allotropic Form of Carbon. WILLIAM G. MIXTER. (By title.)

Some Experiments on the Fuel Value of Coal Ashes. HENRY FAY. (By title.)

Bleaching of Flour. EDWARD GUDEMAN. (By title.)

The Action of Water and Salt Solutions upon Certain Slightly Soluble Phosphates: F. K. CAMERON and L. A. HURST.

The hydrolysis was shown to be relatively great, and to depend upon the proportion of solid in contact with the solution. The effect of alkalies and acids was to increase the amount of phosphoric acid dissolved from iron or aluminum phosphate, but the effect of neutral salts could not be predicated.

The Action of Water and Some Solutions on the Phosphates of Calcium: J. K. CAMERON and ATHERTON SEIDELL.

Owing to the similarity between results obtained with iron and aluminum phosphates on one hand and tricalcium phosphate on the other, it was deemed advisable to study also mono- and dicalcium phosphates, which can be obtained as definite and well characterized solids. Monocalcium and tricalcium phosphates are greatly decomposed by water, while dicalcium phosphate is but slightly decomposed and is the stable form under ordinary conditions.

The Solubility of Calcium Sulphate in Solutions of Nitrates: ATHERTON SEIDELL and J. G. SMITH.

Experiments were made with the nitrates of magnesium, calcium, sodium and potassium, the character of the phenomena differing in each case.

The Disinfection of Public Water Supplies: GEORGE A. SOPER. (By title.)

Relation of Chemical Disinfectants to Hygiene and Sanitation: WM. DREYFUS. (By title.)

The Determination of Ammonia in Milk: H. C. SHERMAN and W. N. BERG.

The method described is an adaptation of the Boussingault vacuum distillation as modified by Shaffer for the determination of ammonia in urine. The results obtained in the examination of fresh milk are believed to be accurate within a variation of ± 0.0003 per cent. and furnish a very delicate means of following certain types of fermentation. The method is being employed in a study of the amounts and significance of ammonia in cows' milk.

The Variations in Standard among Ventzke Saccharimeters: HARRIS E. SAWYER.

Examination of sixteen quartz-wedge saccharimeters,—fourteen being Schmidt and Haensch instruments,—has shown that there seem to be two standards of adjustment among polariscopes of this class.

Five instruments were found which evidently are intended to read 100°, on a 200 mm. column of sucrose solution, prepared and polarized at 17½° C. and containing 26.048 grams of sugar in 100 Mohr c.c. The other eleven instruments were as obviously graduated to read 100° on a solution of the same normal weight, at the same temperature, in 100 true c.c.

The comparison of these instruments was made by the use both of quartz plates and of standard solutions of sugar.

The Colorimetric Estimation of Magnesium: OSWALD SCHREINER and W. S. FERRIS.

Magnesium precipitated with K_2HPO_4, then washed with three per cent. ammonia solution, dissolved in aqueous nitric acid and treated with ammonium molybdate, gives a color suitable for comparison against standard solutions prepared from sodium phosphate. Results were given showing an agreement of about 0.5 part per million.

The Colorimetric Estimation of Phosphates; Second Method: OSWALD SCHREINER and B. E. BROWN.

The first method previously described requires the precipitation of the phosphorus as the well known yellow molybdate containing phosphorus and ammonia. In this second method the phosphorus is precipitated with magnesia solution, washed with ammonia, dissolved in nitric acid, and read in the colorimeter after addition of molybdate.

Determination of Sulphur and Phosphorus in Food, Fœces and Urine: J. A. LE CLERC and W. L. DUBOIS. (By title.)

Device for Reading 'Nesslerized' Ammonia Tubes in Water Analysis: W. P. MASON. (By title.)

A Peculiar Occurrence of Bitumen and Evidence as to its Origin: WILLIAM CONGER MORGAN. (By title.)

AUSTIN M. PATTERSON.

MATERIAL VERSUS INTELLECTUAL DEVELOPMENT OF OUR UNIVERSITIES.

THE material development of our universities within the past two decades may safely be characterized as phenomenal, and has been more than commensurate with that of the country at large.

As a result the plain inexpensive college buildings of the past now stand by the side of palaces of to-day, while stately gateways and imposing walls flank the carefully graded grounds that once constituted the relatively unkempt campus.

Public taste is being awakened and directed to an appreciation of the beautiful. But apart from the esthetic side the equipment of scientific laboratories and the development of college libraries and museums have been distinguishing features in the recent growth of our institutions of higher learning.

The surroundings of the student are now far more hygienic than in the past, and things once regarded as luxuries are now rightly considered necessities of life. As an evidence of this we need only quote the following from a recent annual report of the president of Harvard University: "The practise of fifty years ago at Harvard College in respect to ventilation would now be against the law, * * * and public opinion would not now endorse the complete absence of bath-rooms from the dormitories owned by the college, an absence which occasioned very little remark down to the year 1890."

But lest we praise too unstintingly this unparalleled progress of the past twenty years, we should seriously consider whether the intellectual welfare of our universities is developing in even measure with their material progress.

The beauty of college grounds and stately buildings can not of itself elevate public taste, nor can extensively equipped laboratories turn out great workers in the fields of science. Too often, indeed, these things stultify through the very sense of satisfaction they engender in our minds. A wooden shed at Penikese was a sufficient opportunity for an Agassiz, and the dull routine of a colliery was but an incentive to the inventive mind of a Stephenson.

The age demands strong men and we must learn to respect our colleges not for their wealth in material things, but for having been the cradle and the home of leaders of thought and action.

A study of the reports of the commissioner of education and of announcements of college presidents and other officers may throw some interesting light upon certain phases of the intellectual and material progress of our colleges. Certain features, such as the increase in the number of students, the growth of libraries, the increase in the faculties and the development of the