processes by which energy is released, leaving respiration to designate the more superficial phenomena of aeration with which plant physiologists are little concerned. Perhaps the word respiration is already too firmly imbedded in literature to be so limited. It will at least do no harm to propose that the terms aerobic and anaerobic *energesis* be considered, to which fermentative *energesis* may be added if necessary. CHARLES R. BARNES.

THE UNIVERSITY OF CHICAGO.

THE AMERICAN CHEMICAL SOCIETY AND SECTION C OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE meetings were held in the John Harrison Laboratory of Chemistry of the University of Pennsylvania, with the exception of those of the Section of Agricultural, Sanitary and Physiological Chemistry, which were held in the Dental Hall of the university. On Wednesday morning, December 28, there was a short meeting of Section C for organization. It was presided over by Professor L. P. Kinnicutt. The following officers were elected to serve during the meeting.

Councilor—James Lewis Howe.

Member of General Committee—H. P. Armsby.

Member of Sectional Committee, 1905–1909—Wm. McPherson.

Local Press Secretary—J. M. Mathews.

Following the meeting of Section C there was held the first session of the Chemical Society. President Arthur A. Noyes was in the chair.

J. A. Parker read a resolution opposing the passage of the Mann Bill, now before Congress. The resolution was referred to the Committee on Patents and Patent Legislation, and was amended to read as follows:

Resolved: That the present patent law is sufficient protection to American inventors and American industries provided that it be so amended as to require that, in order to secure protection for the legal period, the inventor must operate his process or manufacture his product in the United States on a commercial scale within two years after the issue of his patent, and must continue to do so during the life of the patent.

Professor Edward Hart then read a paper on 'Some Present Problems in Industrial Chemistry.'

He first described the Louisiana sulphur deposits which recently began to yield sulphur at the rate of 16,000 tons monthly at a cost of less than three dollars per ton. He then took up in detail the imports, exports, production and consumption of the important heavy chemicals and showed that much progress has been made in the recent past in supplying our own markets with the domestic products. This progress was most marked in metal products, of most of which we are now the largest producers. Among instances of recent progress the discovery of Mr. Gayley that dry air gave much more economical results in the iron blast furnace was cited and it was shown that at the most moderate computation this meant an addition to our national income of nine million dollars. Among the problems to be attacked by the chemist the following were cited: (1) A cheaper method for burning cement, (2) a cheap substitute for rubber, (3) an artificial cheap nitric acid, (4) extraction of potash from feldspar, (5) utilization of titanium compounds, (6) the home manufacture of coal tar products.

The speaker was of the opinion that great progress had been made in chemical industry in quality as well as quantity of product, and that we should soon lead the world in this branch of industry.

After this Professor James Lewis Howe read a paper on 'Recent Progress in Inorganic Chemistry.' This appeared in the

January number of the *Journal of the Chemical Society,* page 62.

F. W. Clarke, as a member of the International Committee on Atomic Weights, and of the corresponding committee of the society, gave an account of the changes made in the atomic weights during the year. The report of the International Committee is published in the January number of the *Journal* of the society. It was discussed by W. A. Noyes, W. D. Bancroft, A. A. Noyes and R. C. Wells.

At the afternoon meeting, the address of Wilder D. Bancroft, the retiring vice-president of Section C, on 'Future Developments of Physical Chemistry,' was listened to with great interest. It was published in SCIENCE, January 13, page 50.

On Thursday morning there was another general meeting of the society, at which the following papers were read:

The Atomic Weights of Sodium and Chlorine: THEODORE W. RICHARDS and R. C. WELLS.

Very careful analyses and syntheses of sodium and silver chlorides, made with purest materials from many sources, were made by several methods. These furnished convincing evidence of weighable traces of impurity in Stas's silver, and minor errors in his methods of work. Many observations were made which must be considered in any investigation of the highest accuracy, concerning the occlusion of impurities by precipitates, and the solubility of precipitates. Nearly a hundred quantitative experiments were made, and of these thirty ranked as final determinations. The result for the atomic weight of sodium was 23.008, and for the atomic weight of chlorine 35.473, if silver is taken as 107.930; but evidence was obtained showing that this value for silver is slightly too large. Further investigations, connected with and suggested by this work are in progress. The authors are greatly indebted to the Carnegie Institution of Washington for pecuniary assistance.

The paper will be published in the 'Publications of the Carnegie Institution of Washington' and also in the *Journal of the American Chemical Society.*

The Present Condition of Analytical Chemistry: W. F. HILLEBRAND.

The author refers to the evidence that has accumulated during the past years, showing a condition in technical analysis in this country which calls for the earnest attention of chemists, and particularly of instructors of chemistry. An opinion seems to be gaining ground that faulty instruction is at the bottom of much of the trouble. This view the author is forced to regard as not unfounded, though he thinks the faults are more commonly those of omission than of commission. He regards it as of the greatest importance that students should be made to think at every step of what they are doing and why they are doing it, that they should be made to test their distilled water and reagents as a matter of course, both as to quality and quantity of contamination, so as to have definite knowledge regarding the magnitude of the errors in their work ascribable to these impurities; that they should be obliged to check the accuracy of their work by analyzing some fairly complex material like a limestone, cement or slag, the exact composition of which has been carefully ascertained. The committee on uniformity in technical analysis of the American Chemical Society will soon be ready to send to all applicants a standard limestone of known composition, so that instructors may test their own or their students' skill as analysts, and employers that of their employees. No good work can be done unless the workman has good tools and knows how, when and why to use them. Full recognition is given of the adverse conditions confronting many, if not most, chemists in technical laboratories, but the claim is made that the thoroughly grounded student will be better able to secure satisfactory results, even under adverse conditions, than the one who is taught only the quick methods of the mill or smelter, without any adequate knowledge of the pitfalls in his path and of the proper means of avoiding them. The one who is thoroughly grounded in the minutiæ of a few complex analytical procedures will be the better fitted to use and apply short-cut methods with judgment. An appeal is also made to chemists to aid the committee of purity of reagents of the American Chemical Society in securing a better quality of reagents.

Diet in Tuberculosis: Harvey W. Wiley.

The physician should select a menu adapted to each patient. The oils, especially cod-liver and olive oil, are most beneficial. Alcohol has a food value, and is, besides, a stimulant. Whiskey, brandy and other beverages have often been used to great advantage. Easily digested foods, such as milk, eggs, soups, rare meats, fruits and vegetables furnish a variety of palatable dishes. The great value of a correct diet is in helping the physician to carry the patient over a crisis by giving strength to overcome the predatory character of the disease.

Proper Diet for the Tropics: Harvey W. Wiley.

Less food is needed in the tropics than in temperate climates because less animal heat is required. Tropical fruits are perhaps the best general diet. Any large excess of protein is to be avoided.

The Ripening of Peaches: W. D. Bigelow and H. C. Gore.

A study was made of the composition of six varieties of peaches, including both early and late and of varying texture and flavor. Samples were taken at three periods, and, when possible, at four periods of their growth. First, just after the June drop; second, at the time of hardening of the stone; third, at the time of market ripeness; fourth, the time of full ripeness. The results were expressed both as percentage composition of the peaches and as grams per peach. The results obtained were compared with those obtained by the same writers in the study of the ripening of the apple. Unlike the apple, the peach has practically no starch and apparently no reserve material, at least in appreciable amount, which will increase sucrose after the peach is separated from the tree. Unlike the apple, therefore, there is no increase of sucrose after picking. There seems to be some inversion of the cane sugar with the formation of invert sugar, but such changes are not nearly so marked as in the case of the apple. Between the time of the June drop and the time of market ripeness the flesh of the peach is increased on the average about ten times, while the weight of the stone increases about seventy per cent., and the weight of the embryo ninety-five per cent. The total solids in the flesh increase about ten times in weight, the marc increases about three times in weight, although the percentage of marc in the ripe peaches was much less than in the green peaches. In the percentage composition of the peach the reducing sugar decreases throughout the life history, whereas the sucrose increases. The acid also increases from the time of the June drop until the peaches become ripe. The nitrogenous bodies, both in the form of albuminoids and in the form of amido bodies, decrease in percentage and increase in grams per peach. There appeared to be no evidence of the change of proteids into the simpler amides, or *vice versa.*

A fuller account of this work will be given in a Bulletin of the U. S. Department of Agriculture, Bureau of Chemistry.

The Liberation of Hydrogen during the Action of Sodium on Mercury: L. KAHLENBERG and H. SCHLUNDT. (Read by title.)

The results of the annual election were then announced, the following officers having been chosen for 1905.

President—F. P. Venable.
Secretary and Editor—Wm. A. Noyes.
Treasurer—Albert P. Hallock.
Councilors—W. F. Hillebrand, C. F. McKenna, H. P. Talbot, J. M. Stillman and E. H. Miller.

The reports of the treasurer, secretary, librarian and the different committees were then read.

At present the total number of members is 2,675, exclusive of 124 who have been elected but have not yet qualified. The net gain for the year is 247. The balance of current funds is $1,187.90. The committee on publications received 209 papers, of which all but 39 were accepted. The increase of about 300 pages in the *Journal* represents original work mainly.

The committee on duty-free importations stated that new and very favorable rulings had been obtained in regard to imports. The report of the committee on patent legislation has already been mentioned.

On Thursday and Friday the different sections of the society held meetings, at which the following papers were read:

PHYSICAL CHEMISTRY.

Arthur A. Noyes, chairman.

Freezing-point Depressions of Aqueous Solutions of Some Benzene Derivatives: E. H. LOOMIS.

The Behavior of the Bronzes: W. D. BANCROFT.

Copper-tin bronzes containing more than 92 per cent. copper show no inversion temperature. Bronzes containing 75–92 per cent. copper show an inversion temperature at about 500°. The tensile strength and ductility of the first group of bronzes is affected but little by heat treatment, while heat treatment has a very great effect for the second group. The strongest bronze has a composition of about 80 per cent. copper and a tensile strength of about 72,000 pounds per square inch. It is composed of β crystals with just a small amount of α crystals. The most ductile bronze has a composition of about 90 per cent. copper and gives a 40 per cent. elongation for a rod one centimeter in diameter. It consists of α crystals with just a small amount of β crystals. This work is being carried on under a grant from the Carnegie Institution.

Hydrochloric Acid Concentration Cells: W. D. BANCROFT.

Sodium amalgam concentration cells have abnormally high electromotive forces but this has been shown to be due to the heat of dilution and not to a dissociation of sodium in sodium amalgam. Hydrochloric acid and sodium chloride concentration cells with calomel electrodes have abnormally high electromotive forces; but only a relatively small portion of this discrepancy can be attributed to the heat of dilution. The balance must, therefore, be due to electrolytic dissociation.

Electrical Conductivity of Aqueous Solutions at High Temperatures: A. A. NOYES and H. C. COOPER.

Electrolysis of Chromic Chloride Solutions: H. R. CARVETH.

The writer has studied the electrodeposition of the metal from chloride and sulphate solutions and finds that the current efficiency depends upon the amount of the chromous salt present. The nature of the anode solution has a very marked influence on the efficiency; this is partly explained by the reaction between the diffusing anolyte and the chromous salt in the cathode chamber. Attention is also directed to a number of important factors which have not hitherto been carefully controlled, although they affect the yield very materially.

The Efficiency of Centrifugal Purification: T. W. Richards.

The very great gain in time, labor and material effected by centrifugal draining and washing during the purification of crystals was demonstrated by quantitative experiments, and simple forms of apparatus were suggested which secure these advantages to the organic chemist or to the worker with small quantities of precious material.

Electro-stenolysis and Faraday's Law: T. W. Richards and B. S. Lacy.

It was demonstrated by quantitative experiments that the deposition of large quantities of silver electro-stenolytically in the middle of an electrolytic cell had no effect on the weight of the deposit of silver at the cathode, and, therefore, that Faraday's law still holds true under these peculiar conditions. This is of interest in its relation to the porous cup coulometer, although it is true that no electro-stenolytic deposits are observed on the cup under ordinary conditions.

These two papers will appear in the *Journal* of the society.

The Mercury Sulphocyanate Complexes: M. S. Sherrill and S. Skowronski.

The paper is published in full in the January, 1905, number of the *Journal* of the society.

The Solubility of Calcium Sulphate in Solutions of Ammonium Salts and of Certain other Salts: F. K. Cameron and B. E. Brown.

It is shown that the solubility curve for calcium sulphate-ammonium chloride has a maximum value corresponding to about 225 grams of the more soluble salt per liter, and about 10.9 grams per liter of calcium sulphate. From this point on, with increasing concentration of ammonium chloride, the solubility of calcium sulphate decreases, until in a saturated solution there is only 7.4 grams per liter calcium sulphate. The ammonium nitrate curve is similar to the ammonium chloride curve, the solubility being somewhat higher. Here again, with high concentrations with respect to the more soluble salts the solubility decreases until in a saturated solution of ammonium nitrate it is only about half as soluble as it is at the maximum point.

The authors give the data they obtained with a concentration of the solution with respect to calcium sulphate and other more soluble salts, such as the chlorides, nitrates and sulphates of sodium, magnesium and ammonium.

The Action of Water upon Calcium Phosphates: F. K. Cameron and A. Seidell. (Read by title.)

The Action of Solutions of Potassium Nitrate upon Tricalcium Sulphate: F. K. Cameron and J. G. Smith.

The authors studied the action of solutions of various concentrations with respect to potassium nitrate upon tri-calcium phosphate at a temperature of 20°, for various lengths of time and for various proportions of solid to solution. It was shown that increasing the concentration of potassium nitrate increased both the phosphoric acid and the calcium going into solution, but that the ratio of calcium to phosphoric acid steadily decreases until in saturated solutions of potassium nitrate the ratio is approximately that required by the formula of tri-calcium phosphate. It appears, therefore, that increasing the amount of potassium nitrate in the solution reduces the hydrolizing action of water, although the solubility of the substance steadily increases.

Molecular Attraction: J. E. Mills.

The article was a summary of work

already published (*Journal of Physical Chemistry,* June, 1904, and December, 1904) and of work along the same line yet to be published. An equation was deduced based upon the idea that the so-called cohesive forces between the molecules of a liquid could be entirely and quantitatively accounted for on the supposition of an attractive force between the molecules, the force varying inversely as the square of the distance apart of the molecules. The deduced equation was tested by an examination of twenty-five liquids over wide ranges of temperature and pressure. The measurements used were, for the most part, those made by Drs. Ramsay and Young and Dr. Young. The result undoubtedly allows the conclusion to be drawn that the intramolecular forces obey a law exactly similar to the law of gravitation, *i. e.,* the attraction between the molecules of any liquid varies inversely as the square of the distance apart of the molecules, does not vary with the temperature, and is a function of the number of molecules (mass) considered.

The results also point to the conclusion that the so-called molecular association, as in the case of water, is caused by this same molecular attraction and not by another force such as chemical affinity.

On Crompton's Equation for the Heat of Vaporization: J. E. MILLS.

An equation proposed by Mr. Crompton (*Proc. Chem. Soc.* (London), Vol. 17, 1901), $L = 2RT \log e\ d/D$ (L is heat of vaporization, R is the constant of the gas equation, $PV = RT$, T is the absolute temperature, d and D are the densities of liquid and vapor, respectively) was examined. It was shown that the latent heats so calculated were invariably and usually very considerably too high at low temperatures where the vapor pressure is small, but at high pressure, as the critical temperature of the liquid is approached, the results are in excellent agreement with the true heats of vaporization. Some important results following from this equation were pointed out. The article was published in the *Journal of Physical Chemistry,* for December, 1904.

AGRICULTURAL, SANITARY AND PHYSIOLOGICAL CHEMISTRY.

Wm. P. Mason, chairman.

Interpretation of a 'Water Examination': WM. P. MASON.

The paper will be published in SCIENCE.

The Water of Utah Lake: F. K. CAMERON.

In this paper comparisons are made of analyses of Utah Lake water covering a period of twenty years. It is shown that the mineral content of the water is continually increasing, the water containing about 300 parts of total solids in 1883 against over 1,400 parts per million of solution at the present time. This increase is mainly due to sodium chloride introduced by the seepage waters from the surrounding irrigated areas, which areas have been brought under cultivation since the first analyses were made; second, by the diversion, for irrigation purposes, of mountain streams formerly entering the lake; and third, by the relatively large evaporation from so shallow a body of water.

Determination of Oxygen consumed in Water Analysis: L. P. KINNICUTT.

The amount of oxygen consumed by a given water depends on the method used for determining this factor. Analyses of many samples of water and sewage show that the results obtained by the two English four hour methods, the 'English official' and the 'Manchester,' agree very closely with each other.

The results obtained by the four modifications of Kubel's method, which are used in this country, are not only very different from the results obtained by the English methods, but give varying results, depending on the modification used.

We are able to make a rough comparison between the results obtained by the English methods, with those obtained by the modifications of Kubel's process, and compare with each other the results obtained by the four modifications of Kubel's process. To compare results obtained by the English methods with Palmer's modifications of Kubel's process, thirty minutes at 100° C., with potable waters multiply the former by two and one half; to compare with American Association for the Advancement of Science method ten minutes at 100° C., potable waters multiply by two, with sewage multiply by four; to compare with Public Health Association method, five minutes at 100° C., with potable waters no change, with sewage multiply by two and a quarter; to compare with Massachusetts State Board of Health method, two minutes at 100° C., with potable waters no change, with sewage multiply by two.

To compare in the same way with each other the results obtained by the modifications of Kubel's process the following table can be used, taking the results obtained by the M. S. B. H. method as unity.

	M. S. B. H.	A. P. H.	A. A. A. S.	Palmer's
Potable waters..	1	1.25	1.75	2
Sewage	1	1.50	2	2.50

Standard Methods to be used in the Sanitary Analysis of Water: L. P. KINNICUTT.

A paper showing that the results obtained in the sanitary analysis of water depend to a large extent on the method of procedure by which the various determinations are made, and that at the present time there is no conformity among chemists as to the method of procedure. A variation of one hundred per cent. in certain determinations, depending on the process used, is not uncommon. The only way of obtaining results which shall be comparable is to follow the lead of the official agricultural chemists of this country and adopt standard methods to be used in the analyses of potable waters and sewage.

Determination of Nitrites in Water: R. S. WESTON.

Biochemistry of Sewage Purification, the Bacteriolysis of Peptones and Nitrates: S. D. GAGE.

In the treatment of sewage by modern biological methods, a great variety of chemical reactions occur, all of which are caused directly or indirectly by the action of bacteria. It was shown that bacteria common in sewage disposal are able to produce ammonia from organic matter, to reduce nitrates to nitrites, to ammonia and probably to elementary nitrogen, to liberate nitrogen from solutions of organic matter and also to fix atmospheric nitrogen. Many sewage bacteria also probably produce the lower oxides of nitrogen as reduction products of nitrates, which oxides may play an important part in the further decomposition of the organic matter in solution either through catalytic action or by direct chemical reaction. The amount of ammonia and the amount of nitrates reduced vary widely with different classes of bacteria, as does also the character of the reduction products of the nitrates. It has been found that a majority of the bacteria common in sewage and in sewage disposal systems reduce nitrates and form ammonia from organic matter, although these two functions are not always synonymous with the same species. Furthermore, it was found that there was a close relation between the ability of bacteria to peptonize insoluble organic matter and the ability to reduce nitrates and to ammonify this organic matter, although many exceptions have been noted to this rule.

The paper will be published in the *Journal* of the society.

An Apparatus for the Rapid Estimation of Urea in Urine: F. C. ROBINSON.

A Comparison of Organic Matter in Different Soil Types: F. K. CAMERON.

A comparison is made of soils with different organic content and soils of various textures, colors, etc., and the conclusion is developed that the organic matter contained in soils is not a general type characteristic. Within any soil type, however, the content of organic matter can be correlated to color and other properties of the soil, and is an important characteristic.

Availability of Nitrogen in the Soil: G. S. FRAPS. (Read by title.)

Homicide by Aconite Poisoning and the Quantitative Estimation of Aconite in the Human Body: H. C. CAREL.

INDUSTRIAL CHEMISTRY.

Edward Hart, chairman.

Wood Turpentine: W. C. CARNELL.

Spirits of turpentine has, for many years, been made by the distillation of the refuse wood of the southern long-leaf pine tree. As much of it was made in a crude way and put on the market poorly refined, it is now almost generally regarded as something different from spirits of turpentine and has received such names as wood spirits, spiritine, turpentine substitute, stump turpentine, etc.

When this refuse wood is distilled by steam and the temperature kept sufficiently low, a product is obtained which can be refined by one redistillation and having all the physical and chemical properties of spirits of turpentine made in the regular way. Its color is water white. Odor, when first made, is somewhat characteristic; when several months old same as regular spirits of turpentine. Specific gravity, 0.862 to 0.876 at 15° C. Distillation, 90 per cent. comes over between 160° and 180° C. Evaporation at 100° C. Residue, 1.13 per cent.

If properly made the product obtained from the refuse is identical with the distillate from the turpentine dip.

The Detection of Rosin in Varnishes: A. H. GILL. (Read by title.)

Best Method for the Analysis of Refined Copper: G. L. HEATH.

The Education of Technical Chemists: I. A. PALMER.

The average good man who enters a commercial laboratory from one of our technical schools is deficient in an understanding of the elementary principles of chemistry and in a knowledge of the ordinary methods of analysis. Most of the manuals are of little assistance, and the rule of thumb man fails when required to devise new methods to meet certain conditions. The technical chemist should be a man of broad education, and as such stands a far better chance of promotion than one of poor training. Technical schools should require more rigid qualifications for entrance, and should not permit lax scholarship. The attempt to imitate commercial practice is of doubtful utility, for there is no time for it, and the ideas carried away by the students are often wrong ones. The technical school should give a broad education in the principles of applied science, with just sufficient laboratory and shop practice to illustrate these principles. The training of the head as well as the hand should be the object sought.

The Utilization of Fine Ores, Flue Dust, Stove Dust, Down-comer Dust, etc., in the Blast Furnace: J. C. ATTIX.

At large furnace plants vast quantities of these materials accumulate, especially where the furnace burden is made up largely of Mesaba or other fine ores or concentrates. Many plans have been devised for working these fine materials and quite a number patented.

Some of the materials used have been

tar, glue, molasses, lime, asphalt and cement, all of which have practically been abandoned.

The method here used is to mix the fine materials with soft coal in varying proportions of from 12½ per cent. to 50 per cent. by weight, and then coke the coal. The coal in coking thoroughly incorporates the fine materials, and when charged into the furnace carries them down beyond where they can be carried over mechanically by the blast, and down to the zone of reduction or fusion, making a self-fueling and in many instances a self-fluxing ore. The plan is applicable at any plant running three or more stacks, or wherever the by-product ovens are used, or wherever the coke is made at or near the furnace.

INORGANIC CHEMISTRY.

James L. Howe, chairman.

The Effect of Water on Rock Powders: A. S. CUSHMAN.

The results of investigations on the effect of water on rock powders, which have been carried on in the Division of Tests of the U. S. Department of Agriculture, were given. It has been found that wet grinding increases the binding power or tendency of the particles to cement together. This effect seems to be accompanied with direct decomposition of certain constituents of the rock magma, which results in forming colloidal films on the particles. The word 'pectoid' is suggested to describe this condition. Most rock powders that have been ground wet show an alkaline reaction to indicators, but if the water is filtered out the reaction is not usually shown. This observation is in line with the well-established fact that coagulated inorganic colloids have the power of occluding the bases from solutions of neutral salts. The analogy between the reactions that take place when Portland cement, powdered glass and rock powders are acted on by water was pointed out.

On the Complexity of Thorium: FRITZ ZERBAN.

The work done by Chas. Baskerville on the elementary nature of thorium was repeated under similar conditions and his results were confirmed.

In addition, the acetylacetonates of the three new constituents were prepared according to Biltz's method. The three substances obtained show all the same melting point, viz., 171° C.; by mixing them together, the melting point is not lowered. (Biltz made similar observations in the cases of neodymium and praseodymium.) But the acetylacetonates of berzelium, carolinium and new thorium differ in their chemical behavior towards alcohol. Determinations of the atomic weight which were carried out with the acetylacetonates by Biltz's method, assuming the formula $Me(C_5H_7O_2)_4$, resulted in 225 for berzelium and 239 for carolinium.

The metanitrobenzoates of carolinium, berzelium and new thorium, prepared by Neish's method, could not be obtained in crystalline form.

Thorium from Brazilian monazite sand was fractioned into three constituents in the same way previously applied to thorium from North Carolina monazite sand; the percentage of berzelium and carolinium, however, appeared to be smaller.

On the Detection of Hydronitric Acid and Hydrazine in their Inorganic Compounds: A. W. BROWNE.

A blood-red coloration is produced when ferric chloride is added in excess to a neutral or very slightly acid aqueous solution containing free hydronitric acid or its salts, or holding in suspension the comparatively insoluble lead, silver and mercurous compounds.* The color is destroyed by

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* See Dennis and Browne, *Jour. Am. Chem. Soc.*, **26**, 577 (1904).

acids, and to some extent by salts of organic acids. With the exception of sulphates, salts of the mineral acids in general have no effect. One part of N_3 in 100,000 parts of solution may be detected. Trinitrides must be separated from sulphocyanates and acetates, should these be present, before the addition of the ferric chloride takes place.

Hydrazine may be detected by making use of either of the following facts concerning its inorganic salts: (1) When heated with nitric acid they are oxidized, yielding hydronitric acid; (2) when treated with silver nitrite under proper conditions they yield silver trinitride.

Tungsten Hexabromide: F. F. EXNER. (Read by title.)

Reaction between Zinc and Copper Sulphate: A. J. HOPKINS. (Read by title.)

Non-Existence of Copper Hydroxide: A. J. HOPKINS. (Read by title.)

Notes on the Absorption of Hydrochloric Acid as a Basis for Standard Solutions: A. T. LINCOLN.

The author described a simple method, in which the amount of hydrochloric acid absorbed in a given quantity of water is determined by weighing, and gave results obtained by his students in using the method.

A New Burette Holder: A. T. LINCOLN.

A New Method of Determining the Oxygen in the Air: I. W. FAY.

The apparatus consists of a stout glass tube, twenty-one inches long and an inch in diameter, sealed at one end and ground evenly at the other. Rods of phosphorus eleven inches long and one eighth inch in diameter are held in place at the closed end by a perforated rubber diaphragm one half inch thick. A paper scale, eight inches long and divided into 200 divisions, is glued to the tube so that the 200 mark is at the open end. The tube is kept full of water when not in use. For a determination, pour out the water down to the zero mark, close with a glass plate and invert in a small vessel of water. When the oxygen has been removed, replace the plate, turn the tube upright and read the volume of gas. Correct for the reduced tension of the gas when the tube is inverted. Then two divisions on the scale are equivalent to one per cent. of oxygen.

A Modified Westphal Balance for Use with Solids: F. N. WILLIAMS.

Reactions in Liquid Ammonia: E. C. FRANKLIN.

Liquid ammonia resembles water in many of its properties, such as high specific heat, heat of volatilization, critical temperature and pressure, and high dielectric constant. Both are associated liquids, both combine with many salts, and both are good ionizing solvents. The reactions of acid and basic amides dissolved in liquid ammonia are closely analogous to the reactions between bases and acids in water, as shown by the general equations:

$$MNH_2 + AcNH_2 = AcNHM + NH_3,$$

and

$$2MNH_2 + AcNH_2 = AcNM_2 + 2NH_3.$$

Reactions of the types below were also studied:

$$AgNO_3 + KNH_2 = AgNH_2 + KNO_3,$$

$$Pb(NO_3)_2 + 2KNH_2 = PbNH + 2KNO_3 + NH_3,$$

and

$$BiI_3 + 3KNH_2 = BiN + 3KI + 2NH_3.$$

It was further shown that salts of mercury, arsenic, etc., when dissolved in ammonia undergo 'ammonolysis' in much the same way that they are hydrolyzed in water. A number of other points of resemblance were given. The article will appear in the *Journal* of the society.

ORGANIC CHEMISTRY.

James F. Norris, chairman.

Laboratory Instruction in Organic Chemistry: JAMES F. NORRIS.

An account of the methods used by the author. Great stress is laid on the work in the laboratory, instead of spending too much time on lectures. An important part of the work is the identification of unknown pure substances and mixtures by a systematic study of class reactions and the determination of physical constants.

The Detection of Palm Oil when used as a Coloring for Fats and Oils: C. A. CRAMPTON and F. D. SIMONS.

Methods are given for the identification of the presence of palm oil in cotton-seed oil which is to be used in the manufacture of oleomargarine. Also two colorimetric tests are given for its detection in oleomargarine itself.

The Detection of Renovated Butter: C. A. CRAMPTON and F. D. SIMONS.

In this paper the difficulties attending the identification of this product were discussed. Notes were given concerning several recent and promising methods for its detection.

A Method for the Rapid Analysis of Sugar Beets: DAVID L. DAVOLL, JR. (Read by title.)

The Rapid Detection of 'Beading Oil' in Whiskeys: O. S. MARCKWORTH. (Read by title.)

A Rapid Gasometric Method for the Determination of Formaldehyde: G. B. FRANKFORTER and RODNEY WEST. (Read by title.)

The Action of Permanganate and Sodium Peroxide upon Formaldehyde, with a Determination of the Heat of Combustion: G. B. FRANKFORTER and RODNEY WEST. (Read by title.)

Firpene, a Terpene and its Comparison with Pinene: G. B. FRANKFORTER and FRANCIS FRARY. (Read by title.)

The Crystalline Alkaloid of Calycanthus Glaucus: H. M. GORDIN. (Read by title.)

The Hydrocyanic Acid Content and Some Other Properties of Cassava: C. C. MOORE.

Methylamine as a Solvent: H. D. GIBBS. (Read by title.)

The Oil of Thymus Vulgaris: W. O. RICHTMANN.

Investigated the influence of soil on oil of thyme (*Thymus vulgaris*). Plants grown on light sandy soil, well drained and somewhat elevated, yielded 0.20 per cent. of red oil containing 45 per cent. of thymol. Other plants grown on heavy clay soil, poorly drained, near the river level yielded 0.22 per cent. of oil. It contained 42 per cent. of thymol.

On Thursday evening Professor Arthur A. Noyes, the retiring vice-president of Section C, gave a most interesting address on the 'Preparation and Properties of Colloidal Solutions,' illustrated with many experiments. It was a valuable summary of the work that has been done in that field, and will be published in the February number of the *Journal* of the society.

On Friday morning there was a general session of Section C, presided over by L. P. Kinnicutt. The report of the committee on indexing chemical literature was presented by Dr. James Lewis Howe, and was referred to the council with the request that it be printed. The following papers were presented:

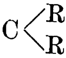
The Nature of Amorphous Sulphur: ALEXANDER SMITH.

It was shown by consideration of the change in mobility, the solubility, the dilatation and the absorption of heat, that there are two liquid states of sulphur. That forming the greater part of the liquid phase up to 160.1° is pale yellow, and mobile, its coefficient of expansion diminishes and its solubility in triphenylmethane increases as the temperature rises. This state is named S_λ. The form which constitutes the greater part of the liquid from 160.1° onward is deep-brown in color and very viscous. Its coefficient of expansion increases and its solubility in triphenylmethane diminishes as the temperature rises. This state is named S_μ. Amorphous sulphur is supercooled S_μ.

On the Constitution of Portland Cement and the Cause of its Hydraulic Properties: Clifford Richardson.

The paper was read before the Association of Portland Cement Manufacturers, June, 1904, and has been published in pamphlet form.

Bivalent Carbon: James F. Norris.

An attempt to prepare compounds of the type  $C\langle^{R}_{R}$, analogous to CO, in which the radicals, R, will have the same energy as oxygen in carbon monoxide. In this way it is hoped to avoid polymerization into $R_2C=CR_2$.

The Need of Action Regarding the Adulteration of Foods and Drugs: Leon L. Watters.

A brief review of the subject, in which the need of legislation was illustrated by examples that had come under the notice of the author.

The members of Section C and of the society were invited to visit numerous manufacturing establishments. A list of these was published in Science, for January 6, page 5.

The visiting chemists unanimously tendered a vote of thanks to the University of Pennsylvania, and especially to Professor Edgar F. Smith, his associates, and to the proprietors of the establishments mentioned.

Dr. C. F. Mabery was nominated by the sectional committee to be vice-president of Section C for the New Orleans meeting and was elected by the general committee.

C. E. Waters,
Press Secretary.

Transmitted by
Charles L. Parsons,
Secretary of Section C.

SECTION F, ZOOLOGY, OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Section F met for organization on December 28, but no papers were read until after the adjournment of the sessions of the American Society of Zoologists. The officers for the St. Louis meeting were as follows:

Vice-President—C. Hart Merriam, U. S. Department of Agriculture.

Secretary—C. Judson Herrick, Denison University.

Councilor—C. B. Davenport, Carnegie Institution.

Member of General Committee—C. H. Eigenmann, Indiana University.

Sectional Committee—C. Hart Merriam, E. L. Mark, C. Judson Herrick, H. F. Osborn, S. H. Gage, C. H. Eigenmann, H. B. Ward, Frank Smith.

For the New Orleans meeting H. B. Ward was elected vice-president and W. E. Ritter member of the sectional committee.

The sectional address by E. L. Mark, entitled, 'The Bermuda Islands and the Bermuda Biological Station for Research,' was not read on account of the absence of the author. Nineteen communications were presented.

Natural and Artificial Parthenogenesis: Alex. Petrunkévitch, Harvard University.

Heredity of Coat Characters in Guinea-Pigs and Rabbits: W. E. Castle, Harvard University.

1. Albino coat and angora coat are recessive Mendelian characters in heredity in guinea-pigs and rabbits.