high velocity are imperfectly understood at present. If we assume, however, that the reactions in the living cell progress rapidly to equilibria, and that in the resting cell, with a plasma membrane offering considerable resistance to the passage of CO_2, a condition of approximate chemical equilibrium prevails—it is clear that any disturbance of equilibrium, as by a more rapid removal of reaction-products (*i. e.*, CO_2), must be followed by a corresponding prompt acceleration of the reaction concerned. Such a system would respond to variations in the rate of removal of CO_2—*i. e.*, to variations in permeability—in a manner which under favorable conditions might well be very sensitive.

The *positive* electrical variation during inhibition (Gaskell)—as well as the negative during stimulation—receives consistent explanation on the membrane-theory if the polarizing electrolyte is assumed to be carbonic (with possibly other) acid. For further discussion the reader is referred to the complete paper in the *American Journal of Physiology*, Volume 24, April, 1909, page 14.

RALPH S. LILLIE

MARINE BIOLOGICAL LABORATORY,
WOODS HOLE, MASS.,
June 15, 1909

THE FORTIETH GENERAL MEETING OF THE AMERICAN CHEMICAL SOCIETY

THE fortieth general meeting of the American Chemical Society was held at the Detroit Central High School from Tuesday, June 29 to July 2, 1909. About 300 chemists were present, making this the most largely attended summer meeting in the history of the society.

On Tuesday evening the visiting chemists enjoyed a complimentary smoker given by the Detroit Society of Chemists.

On Wednesday afternoon and evening the visitors were guests of Parke, Davis & Co. In the afternoon the chemical laboratories were inspected and luncheon was served in the evening. This was followed by a moonlight ride on the river.

On Thursday morning a special train carried the visitors to Ann Arbor on the invitation of the regents of the University of Michigan. A subscription dinner was given at the Hotel Pontchartrain on Thursday evening.

On Friday excursions were made to the following manufacturing establishments: Acme Lead and Color Works, paints, white lead by new process; Morgan & Wright, auto tires and mechanical rubber; Detroit Salt Company, rock salt mine, 800 feet deep; Murphy Ice Company, distilled water, artificial ice—ozonizing plant in connection; Peoples' Ice Company, artificial ice plant; Packard Automobile Company; Detroit City Gas Company, manufacturers of illuminating gas; Cadillac Motor Car Company, auto manufacturers; The Herpicide Company; Goebel Brewing Company; Hiram Walker & Sons, distillery; American Electric Heater Company; Hoskins Manufacturing Company, pyrometers and electric furnaces; Sibley Quarry Company, limestone and sand-lime bricks; Peninsular Engraving Company, engravers and printers; The Clark Wireless Telegraphy Company, manufacturers of wireless equipment; Berry Brothers, varnish manufacturers; Detroit Iron and Steel Company, blast furnace.

The following papers were read before the general meeting:

Optical and Quartz Glass; their Chemical and Physical Properties: H. E. HOWE.

The Chemistry of Phosphorescing Solids: WILDER D. BANCROFT.

The following papers were read before the Section of Chemical Education:

A Place for Chemistry in the American College: ALEXANDER SMITH.

Some Ideals, Some Difficulties and a Compromise for a First Course in Chemistry: S. LAWRENCE BIGELOW.

A First College Course in Chemistry: ARTHUR JOHN HOPKINS.

College Chemistry beyond the Elementary Course: LAUDER W. JONES.

Laboratory Instruction in Industrial Chemistry: HARRY MCCORMACK.

Teaching by the Lecture System: NORMAN A. DUBOIS.

The following papers were read before the various sections:

BIOLOGICAL CHEMISTRY

Samuel C. Prescott, chairman

The Determination of Urea in Urine: F. W. GILL and H. S. GRINDLEY.

This paper gave the results of a somewhat complete comparative study of the Folin, the Benedict-Gephart and the hydrolysis-aeration methods for the determination of urea. The following are the most important conclusions: First, creatinine and hippuric acid are not at all decomposed by heating in the autoclave with hydrochloric acid, but they are partially decomposed either before or after treatment with hydrochloric acid in the autoclave by distillation with 20 c.c. of 10 per cent. sodium hydroxide solution. Second, uric acid is decomposed in part by the autoclave treatment with hydrochloric acid and, moreover, it is still further decomposed into ammonia by distillation with 20 c.c. of 10 per cent. sodium hydroxide solution. Third, the hydrolysis-aeration method purposed by the writers gives practically the same urea nitrogen values as does the Folin method, but the Benedict-Gephart method gives higher results than does the Folin method. The average of the analyses of twenty-five samples of urine in triplicate by the Folin method gave a value of 10.00 grams of urea nitrogen, while the hydrolysis-aeration method gave a value of 10.05 grams, and the Benedict-Gephart method gave a value of 10.25 grams of urea nitrogen per 24 hours. The results of the hydrolysis-aeration method expressed as percentage of the Folin results varied from 99.45 to 101.94 per cent., the average being 100.43 per cent. The results of the Benedict-Gephart method expressed as percentage of the Folin results varied from 100.88 to 103.86 per cent., the average being 102.52 per cent. Fourth, the hydrolysis-aeration method requires much less time and attention than does the Folin method and it does not require the expert manipulation and training necessary to get concordant results as does the Folin method.

Animal Nutrition. The Chemical Composition of the Wholesale Cuts of Beef from Three Animals: A. D. Emmett and H. S. Grindley.

This paper reported the results of the slaughter tests and the detailed chemical analysis of the regulation wholesale cuts of three steers and one calf. The four animals were of different ages and it was thus possible to determine the nature of the growth of the animal body at different stages of its development. From the analytical data obtained it was possible to calculate the weights of the following constituents: water; insoluble, soluble and total dry substance; insoluble, soluble and total protein; coagulable, non-coagulable and total soluble protein; nitrogenous, non-nitrogenous and total organic extractives; fat; insoluble, soluble and total mineral matter; and insoluble, soluble and total phosphorus—in the eleven wholesale cuts and the entire carcass of each of the four different animals.

The results clearly show that with an increase in the age of the animal there is a decrease in the percentage of the following constituents found in the animal body—water, soluble dry substance, soluble coagulable protein, soluble non-coagulable protein, total soluble protein, nitrogenous and non-nitrogenous extractives, and soluble phosphorus, but an increase in the percentage of the following constituents: total dry substance, fat, insoluble protein and insoluble phosphorus. A careful study of the data leads unmistakably to the conclusion that the cheaper cuts of meat in many instances have as high a food value as the more expensive ones. The cheaper cuts are just as wholesome, just as nutritious, and in every way just as good as the more expensive cuts, except that the latter give greater gratification to the palate. The data show that there are noticeable similarities and differences between animals of different age and breed—as to the weights of the bone, the visible fat, the lean meat and also as to the chemical composition of the edible flesh. The results of the chemical analysis indicate well-defined differences due to age and maturity, and marked differences between the wholesale cuts of a side of beef, and yet a noticeable similarity in the relative values of the corresponding wholesale cuts from different animals.

Urinary Creatinine of Men in Health: H. S. Grindley.

A study of the urinary creatinine of a group of 24 men in apparently normal health, varying in age from 18 to 31 years and ranging in weight from 54.0 to 80.1 kilograms, was made for a period of 220 days. A varied and mixed diet consisting of fruits, cereals, vegetables, soups, meats, bread, milk, cocoa and sugar was supplied the members of the club. The ingested nitrogen varied from 10.6 to 15.8, the average being 13.3 grams per man per day. The lowest average individual creatinine value of the 24 subjects for the entire period of 220 days equaled 1.58 grams per day. The highest average individual creatinine value for the entire group for the same period equaled 2.25 grams per day. The average creatinine value expressed as grams per 24 hours for the twenty-four men for a period of 220 days equaled 1.85 grams. The creatinine values in the form of the so-called creatinine coefficients, that is, as milligrams of creatinine per kilogram of body weight, are as follows: minimum 24.4, maximum 31.5, average 28.1.

Folin first proved the fact "that the absolute quantity of creatinine eliminated in the urine on a meat-free diet is a constant quantity different for different individuals, but wholly independent of quantitative changes in the total amount of nitrogen eliminated." The fact that the amount of creatinine excreted in the urine by a normal individual is quite independent of the amount of protein in the food, or of the total nitrogen in the urine, has been verified by many investigators. On the other hand, it seems to me that it is still a question as to whether or not the absolute quantity of creatinine eliminated even on a meat-free diet is a constant quantity for the same individual. Examination of Folin's results shows that between the minimum and maximum creatinine values for the same individual of a group of six normal men, during a period of five days, there are differences of 0.09 to 0.28 gram of creatinine per 24 hours, which differences amount to 6.4 to 22.9, the average being 13.32 per cent. of the minimum creatinine values. Again, for a group of six normal men during periods ranging from 9 to 16 days there are differences of 0.17 to 0.45 gram of creatinine per 24 hours, which differences amount to 15.6 to 35.5, the average being 21.0 per cent. of the minimum creatinine values. Shaffer for two individuals during periods of 8 to 25 days found differences of 0.24 and 0.37 gram of creatinine per day, which equals 19.8 and 26.6 per cent. of the minimum creatinine values. These variations, it seems to me, can not be considered insignificant.

The individual variations in the creatinine for the 24 subjects of this investigation, upon a diet containing meat, during a period of 220 days range from 0.50 to 0.99 grams per 24 hours, which equals 30.1 to 73.8 per cent. of the minimum creatinine values. These variations are apparently caused in the main at least by variations in atmospheric temperature; as a rule, other conditions being the same, the lower the temperature the smaller is the excretion of creatinine, and *vice versa*. The author is indebted to Professor A. P. Mathews, of Chicago University, for valuable suggestions in connection with this work.

A Study of the Food Requirements of a Group of Twenty-four Men: H. S. Grindley and H. H. Mitchell.

The detailed food requirements of a group of 24 men in apparently normal health, varying between 18 to 31 years of age and ranging between 54.0 and 80.1 kilograms in weight were accurately determined for a period of 220 days. A proper variety in diet, and, at the same time, a reasonable regularity in protein, carbohydrate and fat intake were secured by employing a carefully arranged eight-day menu. The protein actually consumed per individual varied from 67 to 99, the average for the 24 subjects being 85 grams per man per day. The grams of protein per kilogram of body weight varied from 1.11 to 1.44, the average for the 24 men being 1.28.

The maximum protein value of 99 grams obtained in this investigation is somewhat below the so-called Voit and Atwater standards of 100 grams for people doing light muscular work, but the average value of 85 grams is decidedly above any of the so-called minimum values of Chittenden, while the minimum value of 67 grams which is for a very light man weighing only 56 kilograms or 123 pounds compares closely with Chittenden's minimum values of 63 to 67 grams for men weighing upon an average 70 kilograms or 154 pounds.

The fuel value varied per individual from 2,584 to 3,685, the average for the entire group being 3,135 calories per day. The calories per kilogram of body weight ranged from 41 to 54, the average being 47. The carbohydrates actually consumed varied from 315 to 441, the average being 380 grams per man per day. The fat eaten varied from 94 to 192, the average being 131 grams per man per day.

Composition of the Fat of Beef Animals on Different Planes of Nutrition (first paper): C. R. Moulton and P. F. Trowbridge.

Fifteen to twenty fat samples from each of nine steers were investigated for moisture, fat and protein content, iodine value, saponification value and melting point. In the fatty tissue a high per cent. of fat is accompanied by a low per cent. of moisture and protein. The fat in the fatty tissue increases with fatness, the moisture with leanness. The fat per cent. in the fatty tissue increases from outside to inside while the moisture decreases. The iodine value of the fat increases with age, fatness and distance from the inside of the body, while the melting point falls.

Changes in the Composition of the Skeleton of Beef Animals (first paper): P. F. Trowbridge and F. W. Woodman.

Seven steers were selected, all of nearly the same age and breed. They were fed to a good fat condition and one was killed as a check (when one year old). The others were put on the same rations (corn chop, linseed meal and alfalfa), varying in quantity so that two of the animals were on submaintenance, losing one half pound in weight daily. Two on maintenance and two on supermaintenance, gaining one half pound daily. One of each group was slaughtered after six months, the second submaintenance after eleven months and the second maintenance animal after one year. Nine separate samples of the skeleton of each animal were analyzed. The results show that the principal effect of poor nutrition upon the skeleton is the removal of fat and its replacement with water, and that this effect is shown only after the fat is practically all removed from all other parts of the body. The mineral matter is practically unaffected by a long period of poor nutrition, and the same is true of the organic matter other than fat.

The Glycogen Content of Beef Flesh (first paper): P. F. Trowbridge and C. K. Francis.

The glycogen in the liver of beef animals is found as high as 3.8 per cent.; in the lean fresh muscle not to exceed two thirds of one per cent. The older animals show more glycogen than do the younger. Enzymatic hydrolysis of the glycogen takes place rapidly and probably accounts for much of the discrepancy of results. At 10° C. or less the enzymatic hydrolysis does not take place.

The Determination of Phosphorus in Flesh (first paper): P. F. Trowbridge.

A comparison of the amounts of phosphorus found in flesh by ignition to an ash and by digestion with sulphuric acid shows the same results by both methods. Phosphorus is not lost by ignition of flesh to an ash in open crucibles.

The following paper was reported by title:

A Review of Methods for the Estimation of Fat in Tissues: Waldemar Koch.

AGRICULTURAL AND FOOD CHEMISTRY

W. D. Bigelow, chairman
W. D. B. Penniman, secretary

Analysis of Citrous Oils: E. M. Chace and H. S. Bailey.

The principal constituents of oil of orange and oil of lemon, and their relative proportion in these oils, are briefly discussed. A short review of the present analytical methods applied to citrous oils for the purpose of detecting the more common adulterants is given. Owing to the increasing tendency to adulterate these oils with their own terpenes, the by-products from the manufacturer of the terpeneless oils and terpeneless extracts, it has become very important that we have some method for the detection of additions of these terpenes to normal oils. With this object in view, the vacuum distillation method has been employed and special apparatus constructed whereby it is possible to distill by means of the electric current 90 per cent. of the oil. The usual typical constituents of the original oil, when compared with those of the residual 10 per cent., have proved themselves valuable guides in the detection of these terpene bodies. A large number of authentic samples have been analyzed and work on the commercial oils of the country is now in progress. The exact data and results of these later investigations will be published at some future time.

The Distillation of Whisky: A. B. Adams.

Samples from different parts of a day's run were taken at two distilleries, one in Pennsylvania, where a three-chambered charge still is used for the distillation of the beer, and one in Kentucky, where the twelve or more chambered continuous beer still is operated. Samples of the beer, exhausted beer, of the leeswater and others representative of the different fractions of the distillation of the first and second distillations were analyzed. The results show that there is practically no fractionation in the distillation of whisky as practised in this country. It being shown that the product is separated into only two portions, first the distillate, second the exhausted beer or leeswater in the second still. The results prove that with the exception of a certain per cent. of acids and esters practically nothing is eliminated in the exhausted beer or leeswater. It was also evident that certain chemical changes occur in the acids, esters and aldehydes during the distillation.

A Volumetric Method for the Determination of Casein: L. L. Van Slyke and Alfred W. Bosworth.

To 20 c.c. of milk in a 200 c.c. flask, one adds about 80 c.c. of water and 1 c.c. of phenolphthalein solution. Then $n/10$ caustic soda is run into the diluted milk until a faint but distinct pinkish color remains after vigorous shaking. One then runs from a burette into the mixture $n/10$ $HC_2H_3O_2$, 5 c.c. at a time, shaking vigorously after each addition. The acid is run in until the casein separates promptly in large-sized flakes, leaving a clear supernatant liquid. It is best to have the mixture at a temperature of 65° to 75° F. before running in acid. Under these conditions, 30 c.c. of acid precipitates the casein in most milks. In some cases, only 25 c.c. may be required, while in some rare cases we have used 35 to 40 c.c. A few c.c. of acid in excess does not affect results. After precipitation of casein is complete, the mixture is diluted to the 200 c.c. mark, shaken vigorously ten or fifteen seconds and then filtered through a dry filter. The filtrate should be clear. One takes 100 c.c. of the filtrate and from a burette adds $n/10$ NaOH until the neutral point is reached. The presence of phosphates may tend to obscure somewhat the end-point, but a little care enables one to get within a drop of the neutral point. The percentage of casein is calculated from the obtained results as follows: Divide the number of cubic centimeters of acid used by 2, subtract from this the number of cubic centimeters of alkali used to neutralize 100 c.c. of filtrate and multiply the result by 1.096. By using 22 c.c. of milk, the difference between one half of acid and of the alkali gives percentage directly without multiplying by a factor. The method gives satisfactory results when carried out with proper care. A determination can be completed in twelve to fifteen minutes, a half dozen or more can be made in about forty-five minutes when all conveniences are at hand and the manipulations are well under control.

The Determination of Nitrates in Potable Waters with High Chloride Content: J. Pearce Mitchell.

The conditions most favorable for the use of the "phenol-sulphonic acid method" were found to be: care in preventing evaporation of sample to complete dryness in the water-bath, prompt addition of the acid, use of an excess of acid (1.5 c.c. at least), and allowance of time for the completion of the reaction with the acid before dilution. Standards prepared according to Mason's suggestion gave the best results. With the reduction method the Cu-M couple in the presence of an excess of oxalic acid (0.5 g. per 100 c.c. of sample) was used. Reduction was complete in fourteen hours. The NH_3 is best determined by distillation, and nesslerization of the distillate. In the case of very high nitrate content the distillate is better collected in a standard acid solution. From laboratory experiments with solutions of known concentrations, and from the analysis of fifty-one samples of natural water by both methods, it appeared that the reduction method gave the better results with low nitrate content.

The procedure recommended is to use the reduction method for routine work; if the nitrate content is found to exceed five parts per million to repeat the determination, using the "phenol-sulphonic acid" method and, if the chlorides exceed ten parts per million, standards prepared according to Mason's suggestion.

The Normal Chloride Content of the Surface Waters on the San Francisco Peninsula: J. Pearce Mitchell.

From an area of 650 square miles 250 samples were collected at different seasons from 126 points. High chloride content, as compared with eastern waters, and wide local variations were found. Actual values varied from 9 to 50 parts per million in unpolluted streams. Discussion of the general climatic conditions, rainfall and ocean winds as factors leading to high values. Consideration of the topography, character of vegetation, exposure to ocean winds and wide local variations in rainfall (15–50 inches) as factors producing great local variations in normal chloride values. Emphasis of importance of study of local conditions, determination of local standards, and need of caution in interpretation of analysis from regions not investigated.

The Relation between the Calcium and the Fat Content of Cream: Hermann C. Lythgoe and Clarence E. Marsh.

This work was undertaken with the view of finding the maximum amount of calcium present in cream beyond which adulteration could be declared. The samples used were known purity samples, the cows having been milked and the cream separated in the presence of an inspector or analyst of the Massachusetts State Board of Health, samples separated from milk collected by the inspectors, and commercial samples found free from sugar by the Baier & Neumann reaction.

The calcium was found to decrease as the fat increased and the figures were plotted. From the plot the following results were taken:

Fat Per Cent.	CaO Minimum Per Cent.	CaO Maximum Per Cent.
50	0.057	0.092
45	0.070	0.103
40	0.082	0.117
35	0.095	0.130
30	0.107	0.142
25	0.119	0.154
20	0.132	0.168
15	0.144	0.180
10	0.156	0.192

The Determination of Benzoic Acid in Food Products: Edmund Clark.

The method proposed for the determination of benzoic acid consists in utilizing both ether and chloroform as extractive agents as follows: An aliquot portion of the filtrate, obtained by filtering a weighed amount of the substance which has been mixed with water and made up to a definite volume, is acidified with HCl and shaken out with three 100 c.c. portions of ether. The unwashed ether extract is distilled rapidly over steam or by electric stove to the volume of about 5 c.c. and the residue exhausted by a current of air. This extract is dissolved in a little alkaline water and, after transferring to a Squibb separator and acidifying with hydrochloric acid, is shaken out with 40, 30, 20 and 10 c.c. successive portions of chloroform. The chloroform extract is washed with 30 c.c. water and transferred to a suitable container to which is added 100 c.c. recently boiled water and a few drops of phenol-phthalein.

The mixture is then titrated with N/20 NaOH, shaking well after each addition of alkali. Each cubic centimeter of N/20 used has a benzoic acid value of .0061. A correction is made for blank chloroform water mixture. The necessity for using ether will not arise when chloroform will readily make the extraction.

The advantages of the method are as follows: First, economy in time and in recovery of solvents; second, avoidance of tenacious chloroform emulsions; third, interfering organic acids eliminated; fourth, loss of benzoic acid reduced to a minimum.

The Determination of Sucrose and Lactose in Sweetened Chocolate: W. D. Bigelow and M. C. Albrech.

The method is proposed to obviate the difficulties ordinarily experienced in the extraction of fat preliminary to the determination of sugar and in the volume of the lead precipitate. A normal weight of the sample (26 grams per Ventske instrument) is placed in a 100 c.c. sugar flask, 90 c.c. of water added and the flask heated with occasional shaking in a water-bath. After the air in the flask is heated a stopper is inserted. When the temperature has reached 70 or 80°, 10 c.c. of basic lead acetate is added and the flask thoroughly shaken and allowed to cool. The mixture is then filtered and the clear liquid polarized and its specific gravity taken. From a table the amount of sucrose is read off from the polarization alone. In the presence of lactose the solution is inverted and again polarized, this time at 86°.

Composition and Treatment of Lake Michigan Water: Edward Bartow and Lewis I. Birdsall.

A zone of pollution has been found to extend into Lake Michigan along the shore of Indiana and Illinois. All communities are not able to extend their water intakes beyond this zone of pollution or to divert their sewage as Chicago does. Filtration must be used to get a pure water. The average composition of the water was determined and experiments made to learn the action of various coagulents that may be used in connection with mechanical filtration.

Lime, sulphate of aluminum, sulphate of iron and sodium carbonate were used either alone or in combination.

The results showed the best results with sulphate of aluminum were obtained when 2½ grains per gallon were used. Two grains of lime could be substituted for one grain of sulphate of aluminum at a saving of $1.34 per million gallons. Sulphate of iron could replace the sulphate of aluminum at a further saving of $1.08 per million gallons. Special care must be taken, however, when lime or sulphate of iron is used.

The Examination of Dried Fish: B. H. Smith.

Cusk and haddock are often substituted for cod in boneless and shredded so-called "codfish" because of their low price and because the preparations made from these fish resemble those of cod, making the detection of the substitution a matter of some difficulty. Hake and pollock are less frequently used, primarily because the reddish color of the former and the brownish color of the latter indicate the presence of these fish.

In an attempt to differentiate chemically the several varieties of closely allied salted fish the body oils were extracted by means of carbon-tetrachloride from desiccated ground samples, representing, in the case of cod, variations of geographical origin and methods of curing, and the iodin number, the refractive index, and, in some instances, other determinations, were made. The iodin numbers in all cases were lower than those of the liver oils of the same variety of fish and even greater variability was evidenced. The results obtained by the Hanus method on the cod samples varied from 85 to 137, which wide range is believed to be due in part to the complex composition of the natural oil and in part to the oxidizing influence of the salting and drying process; the cod substitutes gave iodin numbers of from 112 to 120.

The refractive indices of the oils from the cod samples varied from 1.5020 to 1.5043 at 25°, and those of the other varieties of fish from 1.4890 to 1.5000 at the same temperature. The "reducing substances" of the fish, which were determined by the method of Williams, *Journal of Chemical Society*, LXXI., 649, who reported considerable variation in different varieties, were found in but small amounts and are apparently without significance. The microscopical examination of the fiber promises little because of the variation in the fiber in fish of different sizes, and also in different parts of the fish.

Determination of Caffein in Coffee: A Comparison of the Hilger and Fricke Method with a Modification of the Gomberg Method: A. L. Sullivan.

Five grams of coffee were boiled with four separate portions of water; the combined filtrate treated with 5 c.c. of saturated lead acetate, filtered and washed and the filtrate freed from lead by means of hydrogen sulfide. The solution was evaporated to about 25 c.c., cooled and extracted in a separatory funnel successively with 50, 25, 25, 25 c.c. of chloroform. The combined chloroform extract was freed from chloroform and dissolved in about 25 c.c. of water $\frac{1}{2}$ c.c. (1–5 H_2SO_4) and 20 to 25 c.c. approximately N/10 iodine solution added. The precipitate formed immediately and was allowed to stand for two hours. The solution was then filtered and washed with a dilute acidified solution of iodine (1 part N/10 iodine to 4 of water). The precipitate after standing for a few minutes was dissolved in sulphurous acid and water. The solution was heated until the iodine was driven off, allowed to cool and made slightly alkaline with ammonia. The volume should be about 25 c.c. The solution was again extracted with chloroform, using the same amount as before. The chloroform extract was then evaporated in a tared dish, dried in a water oven and weighed.

It was found that the extraction of caffein from its aqueous solution by chloroform was practically complete.

The results seem satisfactory and it is apparent that the method described is suitable for determination of caffein in coffee. The results are slightly higher than those obtained by the A. O. A. C. method.

The Relation of the Iron Content to the Color of Soils: F. K. Cameron and W. O. Robinson.

A chemical examination of twenty typical red and yellow soils shows that iron oxides are the inorganic coloring matter of these soils. Manganese is present in amounts too small to contribute to the color.

The causes in color variations of iron-colored soils is sometimes ascribed to the presence of different hydrates of iron oxide. From the comparatively small variation in soil temperature in near localities where the two tints are present it is reasoned that this view is incorrect, and that the iron is in much the same state of hydration.

The color is shown to be due to a film of oxides of iron and aluminum, organic matter, silica, etc., surrounding the soil grains. By comparing the color of soils with the iron content and mechanical analysis, it is proved that the thickness of the film causes the variations in color, the thin film of the colored oxide causing the soil to appear yellow, while a thicker film gives a red shade to the soil. This view was confirmed by precipitating ferric hydroxide upon sands of different-sized grains and upon quartz flour, using such amounts as to keep the percentage of iron constant and vary the thickness of the film.

The following papers were reported by title:

A Chemical Study of the Interaction of Fermenting Manures and Ground Rock Phosphate: E. V. McCollum and W. E. Tottingham.

The Estimation of Organic Matter in Soils: G. H. Failyer and W. H. Waggaman.

The Relation of Moisture Content to the Heat Conductance of Soils: H. E. Patten.

The Element System of Nomenclature in Soil Chemistry: C. G. Hopkins.

The Interpretation of Soil Analyses with Respect to Phosphoric Acid: G. S. Fraps.

The Potash of the Soil: G. S. Fraps.

The Oxidation of Organic Matter in the Soil: G. S. Fraps and N. C. Hamner.

The Constants of Pecan Oil: G. S. Fraps.

The Hydrolysis of Salicyn by the Enzyme Emulsion: C. S. Hudson.

No abstracts have been received for papers read before the sections of Fertilizer Chemistry, and the Industrial Chemists and Chemical Engineers. The titles follow:

FERTILIZER CHEMISTRY SECTION

F. B. Carpenter, chairman
J. E. Breckenridge, secretary

Potash Tests in Commercial Fertilizer: J. E. Breckenridge.

The Measurement of Crude Sulphuric Acid: F. B. Porter.

The Corrosive Action of Alkaline Tank Water upon an Evaporation and a Remedy: R. H. Fash.

The Use of Wood Ashes in Commercial Fertilizers: R. H. Fash.

Preparation and Neutralization of the Ammonium Citrate Solution: J. M. McCandless.

The Needs of Texas Soils for Fertilizers: G. S. Fraps.

The Scientific Preparation of Phosphate Samples for Chemical Analysis: P. D. Youngblood.

The Effect on Insoluble Phosphoric Acid when Litmus, Corallin and Cochineal are used in Preparing Solution of Ammonium Citrate: G. A. Farnham.

The Availability of Certain Nitrogenous Manures: Burt L. Hartwell.

Moisture in Phosphate Rock of the Pacific: Carlton C. Jones.

INDUSTRIAL CHEMISTS AND CHEMICAL ENGINEERS

A. D. Little, chairman
B. T. B. Hyde, secretary

Limitations of Use of Starch as an Accelerator in the Fusion Method: C. K. Francis.

The Technical Determination of Caoutchouc in Guayule: Charles P. Fox.

Laboratory Reagents and C. P. Chemicals: Clarence Riegel.

Standard Hydrometers: Louis A. Fischer and N. S. Osborne.

The Temperature Work of the Bureau of Standards: C. W. Waidner.

On the Influence of the Temperature of Burning on the Rate of Hydration of Magnesium Oxide: Edward DeMille Campbell.

The Electrotitrimeter: H. P. Bishop.

The Present Status of the Chemistry of India Rubber: W. C. Geer.

Free Lime in Portland Cement—A Mill Study: Arthur G. Smith.

The Inspection of Material: J. E. Moore.

Bag-house Treatment of Blast Furnaces and Roaster Gases: W. C. Ebaugh.

Hygienic Significance of Sulphur in Illuminating Gas: F. E. Gallagher.

The Destructive Distillation of Coals for Illuminating Gas: An Experimental Study: Alfred H. White.

The Determination of Fat and Soap in Sewage and Sewage Effluents: L. P. Kinnicutt.

Observations upon the Direct Determination of Carbon in Various Steels: G. W. Sargent.

Determination of Nitrates in Potable Water: Robert Spurr Weston.

The Ash of Coal and Its Relation to Actual or Unit Coal Values: S. W. Parr and W. F. Wheeler.

The Analysis of Asphalt and Asphaltic Compounds: S. W. Parr, Brainerd Meras and D. L. Weatherhead.

A Series of Parallel Determinations with the Mahler and Parr Calorimeters: S. W. Parr and W. F. Wheeler.

Further Application of the Specific Gravity Method for Determining Fat: Chas. H. Herty and E. J. Newell.

Some New Extractives for Use in Determining Fats: Chas. H. Herty.

Some Technical Applications of Titanium: Isador Ladoff.

The New Brady Gas Apparatus: William Brady.

A New Oil Gas Producer: A. B. Davis.

Manganese in Steel—a note: A. Auchy.

The Analysis of Lead Arsenate for Water Soluble Impurities: Roger C. Griffin.

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(To be concluded)