

association. The pebbles resemble to a great extent those figured by Dr. Williston some years ago as occurring with a pleisosaur. Another, nearly complete skeleton of a large shark, *Isurus mantelli* Ag., has preserved the larger part of the cranial cartilages. The sharks will shortly be described in detail and further reference need not be made to them here.

ROY L. MOODIE

THE UNIVERSITY OF KANSAS,
January 26, 1912

*THE WASHINGTON MEETING OF THE
AMERICAN CHEMICAL SOCIETY*¹

THE meetings of the society were held from Wednesday, December 27, to Saturday, December 30.

On Wednesday morning four papers were presented in joint session of the Section of Chemical Education and the Division of Physical and Inorganic Chemistry:

A. A. NOYES (chairman): *The Teaching of Physical Chemistry.*

W. D. BANCROFT: *Physical Chemistry in the Introductory Course.*

In the introductory course we should include: gas law; boiling-point curve; solubility; a brief statement of the dissociation theory; qualitative mass law, and qualitative catalysis. We should exclude: quantitative mass law; dilution law; solubility product, and reaction velocity. I am doubtful about electrolysis and osmotic pressure; but I should include the former and exclude the latter.

H. C. JONES: *The Introduction of Physical Chemical Conceptions in the Early Stages of the Teaching of General Chemistry.*

J. HOWARD MATHEWS: *Some Applications of Color Photography in the Teaching of Physical Chemistry.* (Illustrated.)

The theory and manipulations of the "screen-plate" processes of color photography were described briefly. Numerous scientific applications of color photography were pointed out, and each application was illustrated by color photographs thrown on the screen. The process has been found to be exceedingly useful in photographing inter-

¹Most of these papers will be published in the *Journal of the American Chemical Society* or in the *Journal of Industrial and Engineering Chemistry*.

ference figures and in recording the interference colors observed when certain crystals are viewed in polarized light. In many of the slides illustrating the latter, selenite plates were used to produce backgrounds of strong contrast and brilliant color. Photographs of "thin-sections" of various rocks showing their characteristic appearance in polarized light were also shown. The process has been found to be particularly well adapted to the projection of spectrum charts, etc., in colors. The absorption bands of chlorophyll were photographed directly in the spectroscope and a fairly accurate record obtained. Pure spectrum colors are not truly rendered by the process, since the color is always dependent on the dyes used to color the starch grains. However, an attempt to photograph the fluorescence of solutions of fluorescein met with considerable success.

The following three papers were presented in general meeting on Wednesday afternoon:

PRESIDENT FRANKFORTER (Section C): *The Resins and their Chemical Relations to the Terpenes.*

To be published in SCIENCE.

H. P. TALBOT (chairman Division of Physical and Inorganic Chemistry): *Privileges and Responsibilities of the Chemical Analyst.*

A. L. VOGEL: *Ostwald's Proposed International Institute of Chemistry (chiefly bibliography and library practise).*

On Thursday evening two addresses were given in general session:

ALEXANDER SMITH (president American Chemical Society): *An Early Physical Chemist.*

Published in the issue of SCIENCE for February 1.

FRANK B. KENDRICK and H. E. HOWE: *Lantern Experiments on Reactions in Heterogeneous Systems.*

A series of lantern illustrations of the effect of temperature, pressure, concentration, surface, osmotic pressure, etc., on reactions in heterogeneous systems. Several adaptations of a Bausch and Lomb balopticon were described, including a modification of the Töpler "Schlieren" apparatus for projection and the use of the lantern as a photographic camera.

On Friday a symposium on Mineral Waters was held before the Division of Industrial Chemists and Chemical Engineers. Titles of papers presented before this important symposium were published in SCIENCE of January 12. The papers themselves together with the voluminous discussion will be featured in the March issue of the *Journal of Industrial and Engineering Chemistry*.

The following papers were presented before the various divisional meetings:

DIVISION OF AGRICULTURAL AND FOOD CHEMISTRY

H. E. Barnard, *chairman*.

B. E. Curry, *secretary*.

H. E. BARNARD (chairman's address): *A Study of the Pollution of the Ohio River Bordering Indiana*.

During the summer of 1911, the Indiana State Board of Health made a comprehensive study of the condition of the Ohio River bordering Indiana. A chemical and bacterial laboratory was fitted up in a house boat in which samples taken each mile were analyzed. The chemical analysis included the estimation of nitrates, the estimation of nitrites, the estimation of chlorine, of oxygen consumed, the estimation of dissolved oxygen, the estimation of alkalinity and turbidity. The bacterial analyses: an estimation of the number of bacteria; the presumptive test for *B. Coli* and the differential test for *B. Coli* on every tenth sample.

The work, which extended over three months, established new data on the purification of flowing streams and is a valuable contribution to the knowledge of the character of the Ohio River. The report will not be completed for publication until the spring of 1912.

W. A. WITHERS and F. W. SHERWOOD: *A Modification of the Tiemann-Schulze Method*.

B. L. MURRAY: *Determination of Small Amounts of Caffeine—A Comparison of Methods*.

The author has compared the results obtained by the method of Görter and by that of Lendrich and Nottbohm, using coffee and coffee preparations as samples. It is shown that when only small amounts of caffeine, particularly when less than 0.5 per cent., are present the Görter method yields results 50 to 100 per cent. higher than those of the Lendrich and Nottbohm. The author believes the Lendrich and Nottbohm method preferable. About fifty analyses are tabulated, each with duplicate results.

W. H. ROSS and RAYMOND C. BENNER: *The Filtration of Soil Solutions. A New Filter for This and Similar Purposes*.

FERNAND BRUNSCHWIG: *The Presence of Lead and Copper in Cream of Tartar and Tartaric Acid. Technical Methods to Purify these Products*.

J. B. BATHER: *The Forms of Phosphorus in Cotton-seed Meal*.

J. F. SNELL: *An Electrical Conductivity Test for Purity of Maple Syrup*.

The syrup is diluted with two volumes of water and the electrical conductivity measured at 25° C., with a Wheatstone bridge and telephone in the customary manner. The specific conductivity multiplied by 100,000 gives the "conductivity value." The test is simple and rapid.

Among 57 samples of genuine syrups from Quebec, Ontario and Vermont, only two samples (these two not market syrups) give conductivity values over 200. The minimum value found was 110, the syrup giving this being the one prepared under the supervision of the Vermont Agricultural Experiment Station, under such conditions as to give the malate of lime every opportunity to settle out. Values less than 120 were given by only 3 samples—all very light colored, high-quality goods. Genuine syrups may, therefore, be expected to give values between 100 and 200—Canadian syrups ordinarily between 120 and 200.

Syrups compounded of maple syrup with over 50 per cent. of its weight of an equally dense syrup made from granulated cane sugar give values below 100. Imitation syrups made from granulated sugar and artificial maple flavors give still lower values. Such gross adulterations with refined cane sugar are immediately indicated by this test.

JOHN STEWART: *A Brief Study of the Phosphorus Associated with the Matière Noire*.

This paper attempts to answer the question: Is the phosphorus in the *Matière Noire* organic or inorganic? Treatment of the soil with NH_4OH fails to extract any phosphorus. Partial removal of acid soluble phosphorus and complete removal of acid soluble phosphorus, followed in each case with NH_4OH extraction, gives ammoniacal solutions with practically identical phosphorus content; viz., approximately 0.0103 per cent. on soil. The conclusion is that all the phosphorus associated with the *Matière Noire* is organically combined. Practically all the iron and aluminum present in the *Matière Noire* are organic. Hydrolysis takes place during extraction with alkali and a large part of the phosphorus and some iron and aluminum are converted into inorganic forms.

Several precipitating reagents for separating inorganic phosphorus from organic were tried; but results were unsatisfactory.

EMMA CRANDAL: *The Composition of Free Oyster Liquid*.

Present data on the composition of the oyster is meager. The author has endeavored, by a

study of oysters and oyster liquor purchased in the open market, to establish factors which will be helpful in showing whether or not oysters have been floated or watered in transit. This she does by a study of the total solids, ash nitrogen, chlorine of both the free liquor and oyster meats and calcium content, immersion refractometer reading. The data obtained are not conclusive and further work is proposed in the hope that it may be possible to establish definite factors of composition.

H. E. BISHOP: *New Data on the Composition of Prepared Mustards.*

Prepared mustard is a paste composed of ground mustard seed with salt, spices and vinegar and should conform to certain standards of composition. The author, in the course of a study of prepared mustards, finds that they vary greatly in character. He has endeavored by determining certain factors, namely, total solids, ash, sodium chloride, acidity, starch, crude fiber, protein, etc., to gather data of value in determining whether prepared mustards are pure or adulterated. The author finds a great variation in composition. The data at hand are as yet inconclusive. Further work is proposed in the hope that new data, throwing additional light on the composition of mustards, will be forthcoming.

J. M. PRICE: *A Method for the Separation of the Seven Coal-tar Colors when Occurring in Mixtures.*

L. H. SMITH: *Altering the Composition of Indian Corn by Seed Selection.*

In 1896 the Illinois Agricultural Experiment Station began experiments with a variety of corn to alter the chemical composition of the corn by seed selection. Fourteen years of breeding have produced the following results: The protein content has been increased from 10.92 per cent. in the original, to 14.87 per cent. in the crop of 1910. At the same time by selecting in the opposite direction, the protein has been decreased to 8.25 per cent.

Even more striking changes have been produced in the oil content. In the original corn the percentage of oil was 4.70. After fourteen years selection for high oil a strain has been produced which carried 7.72 per cent., while the corresponding selection for low oil has resulted in a strain which contains 2.11 per cent.

J. F. BREAZEALE and J. A. LECLERC: *Influence of Reaction of Culture Medium on Root Development of Wheat Seedlings.*

J. A. LECLERC and B. R. JACOBS: *The study of True and Imitation Graham Flour.*

C. C. MOORE: *The Desiccation of Potatoes and the Uses of the Product.*

The desiccation of potatoes has been commercially developed in Germany, but the product has not been suitable for the manufacture of starch. Investigations have shown that a dried potato product can be prepared in a way suitable for starch manufacture. Owing to the greater degree of fineness to which the dried product can be reduced, over 90 per cent. of the starch can be separated in the usual washing and decantation methods, as against a recovery of 65 to 75 per cent. of starch when potatoes are ground in a fresh state.

P. A. YODER: *Marking of Porcelain and Silica Crucibles, etc.*

Consecutive numbers in platinum or china colors may conveniently and neatly be put upon porcelain or silica crucibles, etc., by use of rubber type.

To apply china colors, a sizing like "Fat Oil," is first stamped upon the crucible, the dry pigment then dusted on, and after the varnish has set, the excess brushed off and the crucible fired in a muffle at a red heat for an hour. Blacks, especially "Lettering Black," gave very satisfactory results and the numbers resisted treatment with hot nitric acid and alkali solutions.

CHARLES FOX: *Perilla Oil.*

P. E. BROWN and R. E. SMITH: *Bacterial Activities in Frozen Soils.*

It was found, in the course of an experiment conducted during the winter months of 1910-11, that bacteria which developed on synthetic agar plates, ammonifying, nitrifying, denitrifying and nitrogen-fixing species whose activities were tested by the beaker method, were alive and multiplied in frozen soils.

In explanation of this, the theory is advanced that when soils freeze the hygroscopic water remains uncongealed, because of the surface tension exerted by the soil particles on the film water, its normal concentration in salts, and its increased concentration occurring when the main body of soil water begins to freeze.

Temperature exerted more influence than moisture on the bacteria developing on the agar plates.

H. H. HANSON: *Report of Progress in a Study of the Maine Sardine Industry.*

This paper gives an account of the industry from the taking of the fish to the finished product in the can, mentions problems of economic interest to the packers and others of scientific importance. There are three important respects in which the Maine sardines differ from the foreign sardines, of which the French pack is recognized as the most desirable. First, the fish packed in France under the name sardine is the *Clupea pilchardus*, while the fish packed in Maine under that name is the *Clupea harengus*, two distinct species of the same family. Second, French sardines are packed in olive oil while the Maine sardines are put up in cotton-seed oil. Third, in handling the French pack the single fish is the unit and quality is at all times considered of paramount importance; while in handling the Maine pack the hog-head is the unit and quantity is always sought. The French sardine retails for from thirty-five to sixty cents per can, while the Maine sardine retails for the most part for five cents. The markets for these two grades seem to be well established.

Indications seem to point to the conclusion that swelled cans are caused for the most part by imperfect sealing, although in some cases it would seem as though the sterilizing process was not sufficient.

An important food of the sardines, known to the trade as "red feed" seems to cause rapid deterioration of the fish. This has been identified as a microscopic crustacean of the family Centropagidae, called *Temora longicornis*. It has been suggested that auto-digestion induced by an enzyme peculiar to this crustacean may be responsible for the rapid deterioration, but it seems more likely from present knowledge of the subject that a methylamine is the cause. Investigation is still going on.

W. B. SMITH: *The Index of Refraction of the Mixed Acids of Fatty Oils.*

Determinations of the ratio between the refraction of oils and of their insoluble acids gave, for linseed, cod liver, soy bean, corn, rapeseed, cottonseed, peanut and olive oils, values between 0.9933 and 0.9942; and for lard, lard stearin, oleo oil, oleo stearin, cocoa butter, butter, palmit oil, cocoanut oil and a mixture of cottonseed oil and oleo stearin, 0.9923 to 0.9941.

These figures are shown to be in accord with calculations from published refractive indices and with the ratios of the refractions of fatty acids

and triglycerides. The ratio is little affected by the saturation of the acid, being about 0.9938 for stearin, olein, linolin and linolenin, but decreases with the lower acids, palmitin, 0.9922; laurin, 0.9905.

Some typographical errors in reference books are noted, and the published refractive index of the acids of olive oil is said to be low by about 0.0050.

B. H. KEPNER: *The Profitable Application of Chemistry to the Milling Industry.*

DIVISION OF PHARMACEUTICAL CHEMISTRY

B. L. MURRAY, chairman.

F. R. Eldred, secretary.

B. L. MURRAY (chairman's address): *Our Advances and Retrogressions in Pharmaceutical Chemistry.*

A. B. ADAMS and J. M. DORAN: *Smoking Opium: Its Manufacture and Chemical Composition. Exhibit—Samples and Smoking Outfit.*

LINWOOD A. BROWN: *An Improved Method of Assay for Aromatic Sulphuric Acid.*

The total acidity is determined by direct titration, using phenol phthalein and N/10 KOH, after which the "free sulphuric acid" is determined by precipitation as BaSO₄.

From the BaSO₄ found is calculated the number of c.c. of N/10 H₂SO₄ equivalent thereto. This is subtracted from the number of c.c. N/10 KOH consumed by total acidity, the difference represents the acidity due to the ethyl sulphuric acid, and from this is calculated the equivalent amount of H₂SO₄.

The U. S. P. method gives too low results, due to the fact that ethyl sulphuric acid is not entirely hydrolyzed on heating for four hours, while in this method the results are higher, closely approaching the theoretical amount of H₂SO₄ known to be present.

Comparative tables of results by the two methods are given.

H. C. HAMILTON: *Notes on Cannabis Indica.*

The paper reviews the more important publications on the chemistry and pharmacology of the drug and describes a process of obtaining a body which possesses high activity.

This substance was not examined chemically, but its physical properties and physiological reactions were investigated and described. It is similar to that of Wood Spivey and Esterfield known as Cannabinol, but is obtained by a different method. No chemical treatment was ca-

pable of separating it into an active and an inactive portion.

Physiologically it was found to produce the typical "Cannabis intoxication" with a smaller dose than any other derivative of the drug so far obtained.

The paper concludes with comments on the peculiarities of this drug, which apparently make it unreliable. This is shown, however, to be due largely to the characteristics of the person on whom the effects are observed and not often, as is commonly supposed, to the variability in the drug itself.

H. C. HAMILTON: *The Pharmacopœial Requirements for Cannabis Sativa.*

The U. S. P. requirements are such that commercial samples of this drug can rarely be used as official because the drug has so often passed to the fruiting stage before being gathered, while to specify that it must be grown in India results in excluding a drug of first class quality grown in other localities.

To remedy this it is suggested that the requirements be made partly chemical and partly physiological. *Cannabis Sativa* is botanically identical from whatever locality it comes. Moreover, the extract soluble in cold alcohol is the active part and the yield of this can readily be determined.

Since the yield of an extract of this character is one of the variable factors and its activity the only other factor of importance the proposal is that the standard for *Cannabis Sativa* be that it shall contain not less than 10 per cent. extractive soluble in cold 95 per cent. alcohol. Further, that this extract must react on susceptible dogs when administered internally in a dose of 10 mg. per kilo weight of the dog.

JOSEPH P. REMINGTON: *Progress on the Work of Revision of the United States Pharmacopœia.*

The American Chemical Society, having representation in the United States Pharmacopœial Convention, should be informed of the progress made from time to time in the work of revision. The sub-committee on scope have made their report and a tentative list of admissions and deletions has been printed in the public magazines and journals. The Pharmacopœia is a book of standards. The necessity for careful and thorough revision. Analytical chemistry the foundation stone in the building of reform structures. The influence of the Food and Drugs Laws on the United States Pharmacopœia. The plan of revision. The American Chemical Society invited by

the chairman to send comments, facts and suggestions to aid in the work.

A. D. THORBURN: *The Estimation of Morphine in Cough Syrups.*

A. ZIMMERMAN: *Laboratory Studies of Rennin.*

A study of the properties of this ferment, when prepared by different methods. The variation in the length of time required to curdle different specimens of milk by rennin and how this is influenced by the milk, according to the length of time it is kept after the milking. Standardizing rennin to use as a control in rennin assay, for more accurate results. The acceleration of the action of rennin upon milk by phosphoric acid. The effect of alkalies upon milk, causing a variation of the length of time required to curd milk by rennin. The influence of heat in changing the acidity of milk, kept for a varied number of hours after the milking.

C. M. PENCE: *The Bromine and Iodometric Methods for the Volumetric Determination of Cresol.*

Usual bromine methods for determination of cresol depends upon fixed conditions predisposing a previous knowledge on the part of the operator, and while they may be of service they do not satisfy the demand for a desirable method.

Tri brom o. and p. cresol brom compounds can not be formed in a manner analogous to the production of 2-4-6 tri brom phenol brom. Di brom cresol brom compounds are formed and finally tri brom phenol brom; however, o. and p. cresols can not be determined volumetrically by a conversion into these compounds.

Meta cresol is determined by a conversion into tri brom m. cresol.

O. and p. cresols from di iodo compounds and this reaction is made the basis of a method for their determination.

Meta cresol does not yield di iodo compounds under the same conditions; hence, cresol U. S. P. or any mixture containing m. cresol can not be determined by a volumetric iodine method.

L. E. SAYRE: *The Analysis of a Very Old Sample of Powdered Gelsemium Root.*

ATHERTON SEIDELL: *A Bromine-hydrobromic Acid Method for the Determination of Phenols.*

CHARLES BASKERVILLE and W. A. HAMOR: *The Impurities of Anæsthetic Chloroform and Methods for their Detection.*

The impurities which anæsthetic chloroform brings with it from the manufacturer ("organic impurities") and the oxidation products of chloroform and alcohol are considered chemically

and physiologically, and rigid methods are given for their detection and estimation. "The main impurities contained in American anæsthetic chloroforms are, besides water, impurities decomposable by sulphuric acid and traces of the oxidation products of ethyl alcohol." The comparative purity of various samples of chloroform is discussed, and the necessary precautions which should be taken by manufacturers to guard against contamination are given. It is pointed out that "serious results have occurred from the use of anæsthetic chloroform containing foreign substances, and (that) although the grades at present sold as chloroform for anæsthesia hardly contain impurities which can be held responsible *per se* for deaths which have occurred during narcosis, yet the presence of these may produce some, at least, of the disagreeable after-effects so often noticeable following the administration of some chloroform." Results are given which lend strong support to the view of the authors as to the nature of the oxidation of chloroform and as to the rôle of alcohol in preservation.

M. I. WILBERT: *The Influence of Patents and Trade-marks on the United States Pharmacopœia.*

J. B. WILLIAMS: *The Estimation of Morphine in Pills, Tablets, etc.*

Morphine is more soluble in a mixture of alcohol and chloroform than in either solvent alone.

The aqueous solution of the sample containing morphine is made alkaline and extracted with a mixture of alcohol and chloroform, the alkaloidal solution evaporated to dryness dissolved in volumetric acid and titrated. Estimations can be made in from 2 to 3 hours.

Comparative results with Thorburn's phenyl-ethyl alcohol method are in favor of the alcohol-chloroform method.

FRANK O. TAYLOR: *Note on Mastic and Sandarac.*

C. H. BRIGGS: *The Alcohol Requirement of the Pure Food and Drug Law and the Accuracy of Alcohol Assays of Pharmaceutical Preparations.*

To meet the requirements of the Pure Food and Drug Law, all pharmaceutical preparations must be assayed for alcohol. Alcohol assays are apt to vary for several reasons. Volatile oils and drug extracts tend to give low results.

A ruling to the effect that fluid extracts and elixirs could be labeled with the maximum content of alcohol is very desirable.

FRED. KLEIN: *A Laboratory Study of Vegetable and Mineral Oils.*

FREDERICK J. AUSTIN: *Comments on Tests of the U. S. Pharmacopœia—Eighth Revision.*

Sets forth the discrepancies in the two tests for iron applied to copper sulphate, the apparent necessity of a time-limit in the test for absence of petroleum benzin, kerosene or similar hydrocarbons in oil of turpentine, the necessity of using larger amounts of hydrochloric and nitric acids in determining whether these acids are sufficiently free from arsenic for reagent use, and the unreliability of the U. S. P. test for absence of oxychloride in solution of iron chloride as an indication of whether it is suitable for use in making the U. S. P. tincture of iron chloride.

R. NORRIS SHREVE: *Suggested Modifications to the U. S. P. Assay of Opium.*

Some samples of opium were cited in case of which the U. S. P. assay will not remove but about two thirds of the morphine. So it is suggested that a very vigorous mechanical agitation be given the opium, and that a test be applied to determine the completeness of the extraction of morphine.

It was shown that the U. S. P. alcoholic mother liquors retain up to 100 milligrams of morphine, and to determine this it is suggested that a blank precipitation be made on pure morphine.

To determine the purity of the crude morphine the Mallinckrodt reassay is recommended.

F. P. DUNNINGTON: *Some Unfamiliar Facts about Familiar Detergents.*

J. R. RIPPETOE and R. MINOR: *Colocynth U. S. P.*

W. O. EMERY: *Estimation of Antipyrine in Acetanilid or Acetphenetidin Mixtures.*

W. O. EMERY: *Estimation of Codein in Acetanilid or Acetphenetidin Mixtures.*

L. F. KEBLER and C. H. KIMBERLY: *Standard for Tincture of Ginger.*

An examination of a number of samples of tincture of ginger also at times designated extract of ginger shows that there was a material variation. Tinctures of ginger from the best manufacturers were then purchased and examined. The Pharmacopœia gives a process for manufacturing this article but does not give a specific standard, neither is the variety of ginger to be employed indicated. The latter is interpreted to mean that any kind of ginger may be used. It was therefore decided to purchase representative available samples of the various gingers on the market and use them in the manufacture of tincture of ginger. A description of the samples together with their fineness is outlined in the paper. The preliminary

examination showed that the available samples of Calcutta and Japanese ginger were not of a character suitable for manufacturing the tincture. Tinctures were then made from all of the samples and it was found, as indicated by the analysis, that the Calcutta and Japanese gingers produced tinctures of inferior character. The standard arrived at was as follows: Specific gravity, 0.8200; alcohol, not less than 88 per cent.; non volatile matter, between 1.25 per cent. and 1.75 per cent.

E. O. EATON: *Estimating Small Quantities of Morphin in Mixtures.*

At the 27th annual convention of the Association of Official Agricultural Chemists, a method for determining small quantities of morphin in mixtures was presented.

The method in brief consists in extracting the morphin from the mixture by means of lime water which is subsequently treated with ammonium chloride, the morphin precipitated, removed with a chloroform-alcohol mixture and the morphin finally determined volumetrically.

During the past year, two mixtures and a sample of opium were submitted to several workers and the results and their observations recorded. In the case of the two mixtures, several workers' results agreed fairly well, but the results obtained with the opium were quite unsatisfactory.

A. G. MURRAY: *Estimating Small Amounts of Nitroglycerin.*

L. F. KEBLER: *Standards and Methods.*

In this paper attention was called to the necessity of carefully studying present available methods and standards. It has been found from time to time that the methods prescribed for arriving at a certain standard are defective and therefore unsuited for careful court work. Particular attention was called to the shortcomings of the present method for determining the alkaloidal content of henbane leaves. The method, as a rule, gives results below the actual content of alkaloidal matter.

The subject of standards was referred to and several specific cases quoted: For example, the standard for cannabis indica is prescribed as a product free from stone cells, which means virtual absence of seeds. Experience shows that it is practically impossible to find such a product on the market. Its enforcement, therefore, would be a most difficult problem. The question of arriving at a fair and just standard was also taken up and discussed fully. For example, the Pharmaco-

pœia prescribes a definite standard for hydrogen peroxid, but it is well known that this commodity is prone to decomposition and the question arose as to what amount of variation should be permitted before considering the article inferior. In order to determine this point, all of the available samples of hydrogen peroxid were purchased and examined by two different observers in several sections of the country. The observations were made during a period extending over one year, and it was found that there was no difficulty whatever in preparing this commodity so as not to fall materially below 15 per cent. of the prescribed standard within six months. If, therefore, a sample of hydrogen peroxid was found to be only one half the strength prescribed by the Pharmacopœia, it was either made by faulty methods or much more time than six months had elapsed since its preparation. Other examples were cited to show that it was absolutely necessary to use judgment and discretion even though the standard was prescribed.

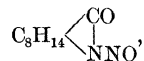
DIVISION OF ORGANIC CHEMISTRY

Geo. B. Frankforter, *chairman.*

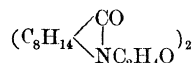
Wm. J. Hale, *secretary.*

WILLIAM A. NOYES and J. A. COSS: *The Decomposition of Nitroso Compounds.*

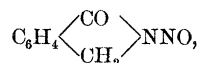
Some years ago Mr. Taveau, with one of us, found that on warming the nitroso derivative of the anhydride of aminolauroic acid,



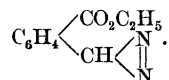
with an alcoholic solution of sodium hydroxide, a compound was formed to which the formula



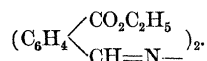
was assigned. A study of the similar decomposition of the nitroso derivative of phthalimidine,



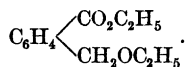
has shown that the primary product is a diazo compound of the structure



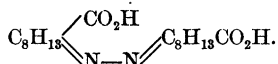
This decomposes, giving the compound



In the presence of alcohol it gives the ester ether



The first of these is, of course, the analog of the compound described by Mr. Taveau and the latter is the bishydrazone of camphononic acid,



HOWARD W. DOUGHTY: *Ortho- and Para-Tolueneselenonic and Tolueneseleninic Acids.*

NICHOLAS KNIGHT: *The Preparation of Certain Oxylactones.*

When phenylcyan pyrroacemic acid ethyl ester is heated with sulphuric acid, the ester is hydrolyzed and water and carbon dioxide pass out of two molecules of the acid. The resulting product is an oxylactone of the formula $\text{C}_{17}\text{H}_{14}\text{O}_8$, which melts at 171° .

When a mixture of phenyl pyro racemic acid is allowed to stand some days with fuming hydrochloric acid the liquid becomes filled with fine needles which on crystallizing from alcohol is shown to be an oxylactone of the formula $\text{C}_{16}\text{H}_{12}\text{O}_8$. The melting point is 206° . A number of salts were made from this oxylactone.

J. U. NEF: *The Three Lactones d-Mannonic Acid and their Bearing on the Constitution of the Sugars and the Glucosides.*

TREAT B. JOHNSON: *The Action of Halogens on Tyrosinehydantoin.*

Methods have been developed for preparing easily 3,5-diiodo-, 3,5-dibromo- and 3,5-dichloro-tyrosines. Bromine and iodine react smoothly with tyrosine, $\text{HOC}_6\text{H}_4\text{CH}_2\text{CH}(\text{NH}_2)\text{COOH}$, forming 3,5-dibromo- and 3,5-diiodotyrosines, respectively. 3,5-Dichlorotyrosine is not formed in an analogous manner by the action of chlorine on the amino acid.

Chlorine and iodine react with tyrosinehydantoin, forming the corresponding 3,5-dichloro- and 3,5-diiodotyrosinehydantoins, respectively. Bromine reacts abnormally with tyrosinehydantoin, giving 3,5-dibromobenzalhydantoin.

TREAT B. JOHNSON: *The Action of Potassium Thiocyanate on α -Amino Acids.*

The hydantoin derivatives of α -amino acids are well known, and of great value for the identifications of these acids. The corresponding nitrogen-unsubstituted 2-thiohydantoins, however, are not known. A practical method has now been developed by which representatives of this new class

of compounds can be easily synthesized. The 2-thiohydantoin derivatives of glycocoll and alanine have already been prepared.

The present communication is in the nature of a preliminary statement regarding the extension of this work to other α -amino acids, which has already been begun. The results indicate that this class of compounds will be of great value in helping us to develop other syntheses of biological significance.

CLARENCE G. DERICK: *Correlation of Ionization and Structure in the Aromatic Series.*

CLARENCE G. DERICK: *A New Proof of the Equivalency of the Pair of Positions 3 and 5, with Respect to Position 1, in the Benzene Ring.*

HARRY S. FRY: *A Critical Survey of some Recent Applications of the Electron Conception of Valence.*

ALVIN S. WHEELER: *New Thermometers for Accurate Melting-point Determinations.*

The thermometers are of the usual length but are graduated only at the lower end so that the graduations are completely immersed in the liquid of the ordinary melting-point bath, the Thiele for instance. There are seven in the set in order to cover the necessary range. They may be obtained of C. Richter, of Berlin, and standardized by the Reichsanstalt. They have met the approval of some very well known men.

ALVIN S. WHEELER: *The Walden Inversion.*

A model consisting of celluloid balls of various colors attached to corks covered with wire bristles designed to attach same to a large bristle-covered ball, the C atom, was exhibited to illustrate the theory propounded by Emil Fischer to explain the Walden inversion. The case studied by the author with Fischer was that of α -hydroxyisohexioic acid. This acid was split into its active forms, the laevo being obtained in pure condition. Its ethyl ester with PBr_3 yielded a bromo ester which was strongly dextrorotatory. But the laevo acid with NOBr gives a laevo bromo acid which yields a laevo bromo ester.

R. R. RENSHAW: *Studies in the Methods of Preparation of Diglycerides.*

The reaction between salts of stearic acid and 1, 2-dibrom and diiodhydrin have been investigated between the temperatures of 130° and 200° . There is formed stearic acid, distearin tristearin and small amounts of a compound containing bromine and stearic acid. Good yields were never obtained. The use of the lead salt seems to be preferable.

At slightly above its melting point dibromhydrin dissociates completely into two molecules, hydrobromic acid and probably epibromhydrin.

Pure 1, 2-dilaurin, diisovalerin and diacetin have been obtained.

R. R. RENSHAW: *Investigation of Choline and its Derivatives*. (Third paper.)

By the action of phosphorus oxychloride on choline chloride there has been obtained a highly hygroscopic, unstable chlorcholine phosphoric acid dichloride.

Experiments on the stability of choline salts have been carried out both by physiological and chemical tests. Pure choline salts give a lowering of the blood pressure. Choline chloride is not a very unstable salt. It can be preserved without decomposition into trimethyl amine or neurine.

WILLIAM J. HALE: *The Formation of Nitropyrimidines*.

CHAS. H. HERTY and C. S. VENABLE: *The Schkateloff Method for Reduction and Precipitation of Resin Acids*.

CARL O. JOHNS: *On 2-Oxy-1-Methylpurine*.

The potassium salt of 2-oxy-5-nitro-6-aminopyrimidine was heated with methyl iodide and a mono-methyl derivative was obtained. The position of the methyl group was ascertained by converting this compound into 2, 6-dioxy-3-methyl-5-nitropyrimidine. When 2-oxy-3-methyl-5-nitro-6-aminopyrimidine was reduced with ferrous hydroxide it gave 2-oxy-3-methyl-5, 6-diaminopyrimidine, which in turn gave a formyl derivative the potassium salt of which, when heated, formed the potassium salt of 1-methyl-2-oxypurine. The free base crystallized with 2 molecules of water. The picrate decomposed at 214° C.

CARL O. JOHNS: *On 2-Oxypurine and 2-Oxy-8-Methylpurine*.

2-Oxy-5, 6-diaminopyrimidine was heated with formic acid and a monoformyl derivative was produced. The potassium salt of this compound liberated water when heated and the potassium salt of 2-oxypurine was produced. The free base crystallized with one molecule of water and the crystals were stable at 110° C., but the water escaped at 130° C. The picrate decomposed at 245° C.

Acetic anhydride reacted with 2-oxy-5, 6-diaminopyrimidine and the chief product was a mono-acetyl derivative. The potassium salt of this was heated and the potassium salt of 2-oxy-8-methylpurine was obtained. The nitrate decomposed violently at 205° C. and the picrate at 250° C.

M. L. CROSSLEY: *A New Derivative of Anthroquinone*.

M. T. BOGERT and M. HEIDELBERGER: *Phthalones in the 4-Quinazolone Group*.

2-Methyl-4-quinazolone condenses smoothly with phthalic anhydride to the symmetrical phthalone, which behaves as a weak acid, forming a yellow mono-sodium salt and a red disodium salt, as well as a red mon-anil, a mono-phenylhydrazone and a sulfonic acid. Energetic reduction converts the phthalone into the corresponding hydrindone. Bromination of the sulfonic acid of the phthalone in aqueous solution yields a dibrom 2-methyl-4-quinazolone, which is not the 6, 8-dibrom compound, a pentabrom 2-methyl-4-quinazolone, a monobrom 2-methyl-4-quinazolone sulfonic acid, phthalic and sulfuric acids. An interesting feature of the reaction is that the bromine splits the phthalic acid off from the quinazolone.

6-Nitro and 7-acetamino 2-methyl-4-quinazolone condense similarly to phthalones. With phthalimide, the 2-methyl-4-quinazolone condenses to the unsymmetrical, or beta, phthaline, with formation of a small amount of what appears to be a bis-quinazolone phthaline.

2-Methyl-4-quinazolone and succinic anhydride react vigorously with production of a tarry mass, from which a colorless anhydro body may be isolated.

2-Methyl-4-quinazolones carrying alkyl groups in position 3 either refuse to condense with phthalic anhydride or give but small yields of phthalone.

In none of the experiments was the formation of any isophthalone observed, nor could we isolate any intermediate products except the phthalate of the quinazolone.

Like the quinophthalones, these phthalones act as yellow dyestuffs, but in tinctorial power they seem inferior to the former.

M. T. BOGERT and G. A. GEIGER: *On Certain New Quinazolines*.

The following new 4-quinazolones have been isolated and studied: 3-ethyl; 3-benzyl; 2-methyl-3-p-nitrophenyl; 2-methyl-3-p-tolyl; 2-methyl-3-alpha naphthyl; 2-methyl-3-beta naphthyl; 6-nitro; 6-amino; 6-acetamino; 6-nitro-3-methyl; 6-amino-3-methyl; 6-acetamino-3-methyl; 6-nitro-3-ethyl; 6-amino-2, 3-dimethyl; 6-nitro-2-methyl-3-ethyl; 6-amino-2-methyl-3-ethyl; monobrom and brom-2-methyl.

The 3-methyl-4-quinazolone of Knape (m.p. 71°) carries a molecule of water of crystallization, the pure anhydrous substance melting at 105°.

Nitration of 2-methyl-3-phenyl-4-quinazoline with a mixture of concentrated sulfuric and fuming nitric acids gives a dinitro derivative; by similar treatment of 2-methyl-3-p-nitrophenyl-4-quinazoline, only one nitro group is introduced; but these two dinitro derivatives are not identical. Nitration of 2-methyl-3-p-tolyl-4-quinazoline also gives a dinitro derivative. The action of nitric acid, in presence of metallic mercury, upon 2-methyl-4-quinazoline gives only the mercury salt of the latter, whereas with quinoline a nitro-hydroxy derivative is produced.

The 4-quinazolones are not readily brominated, but by the Juvalta process bromine derivatives may be obtained.

M. T. BOGERT and G. A. GEIGER: *On Quinazoline Iodomethylates*.

Iodomethylates, and other iodoalkylates, have been prepared from a large number of quinazolines, and the following general conclusions are drawn from the experiments:

1. 4-Quinazolones add alkyl iodides generally only under pressure at about 110°.

2. The alkyl iodide adds to the N adjacent to the benzene nucleus (*i. e.*, the N in position 1 in the quinazoline nucleus) and not to the N in position 3, since the compounds obtained by adding methyl iodide to 2-methyl-3-ethyl-4-quinazoline and ethyl iodide to 2, 3-dimethyl-4-quinazoline are not identical.

3. The iodoethylates are more soluble in water, and in methyl alcohol, than the iodomethylates.

4. By the action of methyl iodide alone, in excess, 4-quinazoline, 3-methyl-4-quinazoline and 4-methoxyquinazoline, all give one and the same product, namely, the iodomethylate of 3-methyl-4-quinazoline.

5. Many of the nitro 4-quinazolones refuse to combine with methyl iodide.

6. Styryl 4-quinazolones add methyl iodide more readily than ethyl iodide, but certain groups in position 3 appear to prevent the combination even with methyl iodide.

7. By the action of silver nitrate upon some of these iodomethylates, corresponding methyl nitrate addition products have been obtained.

M. T. BOGERT and L. E. WISE: *On p-Aminobenzonitrile*. (Third paper.)

The following additional compounds have been prepared and studied: p-aminobenzonitrile picrate, p-cyanoxanilamide, oxanilic p-cyananilide, p-cyan-succinanilic acid, its silver salt, methyl and ethyl

esters, and anil, p-cyanphthalanilic acid and its anil, p-cyanphenylurethane, p-caramido phenylurethane, p-cyanphenyl urea, carbanilic p-cyananilide, p-cyancarbanilide, methylene di(p-cyanphenamine), 3-nitro-4-acetamino benzamide and 3, 4-di-acetyldiaminobenzonitrile.

The nitrile appears to add a molecule of chloral directly, and then on dehydration gives the trichlorethylidene di-p-cyanphenamine.

Bromination of the acetamino nitrile, like nitration, gives the mono substitution product.

From 3, 4-diaminobenzonitrile, the 3-cyan-alpha-methyl benzimidazole can be obtained as well as the corresponding amide.

M. T. BOGERT and G. D. BEAL: *A Further Study of the Stilbazoles, Hydrazones and Schiff Bases in the 4-Quinazoline Group*.

In the condensation of aldehydes with alpha-methyl pyridines or quinolines, the alkines evidently form easily and are often so stable that considerable difficulty is experienced in dehydrating them to the stilbazoles. With these quinazoline condensations, on the other hand, the alkines either do not form at all or are so unstable that they immediately lose water and give the stilbazole. Neither hydrogen nor bromine can be added to the double bond of these stilbazoles, but bromine gives rise to substitution products.

A large number of new aldehyde condensation products were prepared of the above types. Most of the styryl quinazolones are pale yellow and crystallize in fluffy masses of short silky needles. Often they show strong tribo-electric properties. Those with a free hydrogen atom in position 3 usually dissolve readily in solutions of the caustic alkalies and are reprecipitated by carbon dioxide.

Incidentally, a number of new quinazolines were prepared by condensing various amino bodies with acylanthranils, and certain of them were tested with reference to their physiological effect upon animals.

Under the conditions of our experiments, the group which reacted most readily with aldehydes was the 3-amino group, then the 2-methyl, then the 7-amino, while the 2-amino refused to condense at all. Benzaldehyde proved much the easiest aldehyde to condense with these groups, often reacting when all other aldehydes tried failed.

M. T. BOGERT, R. A. GORTNER and A. H. KROPPF: *On Certain New Dyestuffs*.

By condensation of acylanthranils with aromatic primary diamines, new amine bases result which can be used for the production of dyestuffs

in much the same manner as the anilines or naphthylamines.

This paper describes only certain of the azo dyes obtained from these new quinazoline bases, together with a few other related dyestuffs. The dyes described are (A) those obtained by diazotizing aminoquinazolines, with the amino group either on the benzene or on the triazine portion of the nucleus, and coupling with various well-known couplers; and (B) those obtained by using these new bases themselves as couplers for the ordinary diazo salts.

Monazo and polyazo dyestuffs can thus be produced in infinite variety. Those obtained from acylamino acylantranils may be de-acylated and the liberated amino group again diazotized and coupled.

These new dyes include direct dyestuffs for cotton, as well as for wool and silk. Many are fast to light, acid or alkali, washing and milling, bleaching, etc.; they penetrate the fiber well and give level dyeings.

WM. McPHERSON and CECIL BOORD: *The Preparation of Orthoquinones with Complex Side Chains and Their Reactions with Hydrazines.*

E. K. MARSHALL, JR., H. C. ROBERTSON, JR., and MISS J. PEACHY HARRISON: *On the Mechanism of the Reactions of Ethylates with Alkyl Halides.*

N. E. LOOMIS, C. N. MYRES and S. F. ACREE: *The Use of the Hydrogen Electrode in Organic Chemistry.*

RALPH H. MCKEE: *The Preparation of Sulfonic Acids.*

The process of sulfonating aromatic hydrocarbons can be greatly facilitated by the use of vigorous stirring, *e. g.*, cymene with slightly more than its own volume of sulfuric acid (sp. g. 1.42) gave at room temperature in twenty minutes complete sulfonation, where by the use of infusorial earth it requires several days, or shaken by hand on the water bath with much excess of acid it requires a number of hours. The stirrer used rotated 900 times a minute.

Paraffin hydrocarbons, the portion boiling about 200° from ordinary kerosene, stirred with ordinary sulfuric acid at room temperature was partially attacked to give a disulfonic acid. With the fuming acid the hydrocarbon was all attacked with formation of a mixture of sulfonic acids and oxidation products. Strong nitric acid by similar treatment also attacks the paraffin hydrocarbons at ordinary temperature, but the products formed have not as yet been analyzed.

The distinction between the hydrocarbons of the benzene and methane series toward sulfuric and nitric acids shows evidence of being due in large part to the less solubility of the paraffin hydrocarbons in acids rather than to an essentially different chemical character, *i. e.*, the difference is in part one of physical properties (solubility) rather than one of chemical properties.

I. K. PHELPS: *The Preparation of Cyanacetic Acid in Quantity.*

BIOLOGICAL CHEMISTRY SECTION

Carl L. Alsberg, *chairman.*

I. K. Phelps, *secretary.*

W. M. CLARK: *Gases of Swiss Cheese. II.*

Since the gas formed in Emmental cheese is the immediate cause of the formation of the characteristic "eyes," it was hoped that data concerning the gases produced would aid in diagnosing the bacteria which are thought to be responsible for the development of the eyes.

For this purpose apparatus was devised for collecting the gases found in the "eyes" and in "pin holes" and the body of the cheese. It was found that the gas of normal eyes consists largely of CO₂ and nitrogen. Hydrogen is sometimes present in very small percentages. The abnormal production of gas which takes place frequently the first day was found to be accompanied with large percentages of hydrogen.

The gas produced by normally developing cheese during the period of its maximum eye-formation was found to be chiefly CO₂.

The absorption of oxygen was studied as well as the permeability of cheese to different gases.

In the light of all the facts thus gained a discussion is made of the interchange of gases and of the relation of these to theories concerning the formation of the eyes.

L. W. FETZER: *The Cholesterol Content of Milk under Normal and Pathological Conditions.*

From this work it can be noted that a decrease in the cholesterol content of milk takes place under pathological conditions, and where a decrease in cholesterol content was noted there was a corresponding decrease in the fat content. If, however, the cholesterol content was compared with the milk fat on the basis of 100 parts of ether extract, then the cholesterol seemed to be increased.

J. P. ATKINSON: *Quantitative Results of Certain Poisonous Metals and Alkaloids after Digestion of their Enveloping Tissue in Artificial Gastric Juice.*

E. D. CLARK and F. J. SEAVER: *Studies on Soils Subjected to Dry Heat.*

In the present paper we have extended to the green plants our earlier observations of the effects of heated soils upon the growth of fungi. Different degrees of dry heat give soils whose aqueous extracts have a brown color the depth of which is proportional to the intensity of the heat. The amount of soluble matter, organic, inorganic, nitrogen, etc., was also proportional to the different temperatures (90° to 180° C.). The dark extracts from strongly heated soils were favorable for fungous growth but were distinctly unfavorable to Lupin seedlings grown in them; this inhibiting action being greatest in the darkest colored extracts. Oats sown in a series of soils heated to different temperatures showed a slight stimulation for the temperature up to 125°, when compared with the unheated soil as a control; while above 125° the heated soil had a very toxic effect. The organic matter of the darker extracts gives nearly all the tests for reducing sugars, is largely precipitated by acetone, smells like caramelized sugar, and has a strong acid reaction to litmus.

R. H. JESSE and EDWARD BARTOW: *Composition of Gases Formed by the Decomposition of Organic Matter.*

We were called upon to investigate the cause of an explosion of gases in a septic tank at Highland Park, Illinois. In trying to trace the cause of this explosion we collected and analyzed gases from several septic tanks. But little variation was found between the composition of the gases from the tank which exploded at Highland Park and the gases from other tanks in the central west. There was, however, a great variation between the composition of these gases and the reported composition of gases analyzed by other investigators. During the summer of 1911 samples of gases were collected and analyzed from tanks in Illinois, Columbus, Ohio, from Worcester, Massachusetts, and from the Illinois River below the mouth of the Drainage Canal. The greatest difference is seen in comparing the gases from Worcester with the gases from Illinois tanks. The gases from the Illinois River agree closely in composition with the gases from some of the septic tanks and differ very materially from a sample of gases collected from an unpolluted swamp. We have noted differences in gases taken from different compartments of the same tank and there is an apparent difference in gases collected below the upper sludge and in the bottom.

We feel that the results thus far obtained can only be regarded as preliminary to further study of the subject.

E. D. CLARK and R. A. GORTNER: *The Chromogen and Associated Oxidases in the Mushroom Strobilomyces strobilaceus.*

L. A. HAWKINS: *The Effect of Certain Chlorides Singly and Combined in Pairs on the Activity of Malt Diastase.*

R. A. GORTNER and E. D. CLARK: *The Chromogen and Associated Oxidase in the Mushroom, Strobilomyces strobilaceus.*

Upon injury the color change of this fungus is from white through pink to black, this action being a rapid one. We considered that this was a case of ordinary tyrosinase activity and it was only upon examining the material for another purpose that we learned that this assumption was not true. We were unable to detect the slightest trace of free tyrosin by any of the delicate color tests. However, we were able to make preparations of an oxidase from this plant that were very active in causing the oxidation of a tyrosin solution. Evidently, then, this fungus contains a tyrosinase or similar enzyme which oxidizes some other chromogen. This chromogen proved to be pyrocatechin or one of its derivatives, as shown by all the tests and methods at our disposal. The oxidase preparation produced exactly the same change in a solution of pure pyrocatechin that is noticed in the plant itself.

H. H. BUNZEL: *Biochemical Study of the Curly-top Disease of Sugar Beets.*

The paper gives results obtained in oxidase measurements on diseased and healthy beets, on leaves as well as roots, under the various conditions at different times of the day and various stages of development. The result obtained in greenhouse experiments, *i. e.*, that the diseased leaves have a higher oxidase content than the healthy ones, was confirmed in the field. The general result of all the experiments carried out, indicates that the oxidase content is higher in the leaves in all the cases where the normal growth of the plant has been interfered with, whether the retardation of growth is brought about by excessive drought, excessive watering of the soil, the curly-top disease or other diseases. The distribution of the oxidase in the leaves and roots of the plant was measured. Analyses of the samples collected simultaneously with the oxidase determinations are as yet not completed.

C. L. ALSBERG and O. F. BLACK: *Phytochemical Studies in Cyanogenesis.*

The relation between the nitrates in the soil, nitrification during drought and cyanogenesis in sorghum, based on experiments done at the Arlington Farm in the course of the past summer, is discussed and an incidental error in the common method of determining hydrocyanic acid in plants is pointed out.

C. L. ALSBERG and W. M. CLARK: *Notes on the Blood of Limulus polyphemus.*

P. A. YODER: *The Presence and Identification of Choline in Wheat and Cotton Seed Flours.*

OSWALD SCHREINER and J. J. SKINNER: *The Action of Nucleic Acid and its Decomposition Product on Soils and Plants.*

Nucleic acid as well as some of its decomposition products occur in soils and the effect of some of these compounds has been studied with wheat seedlings. Mineral nutrient solutions with phosphate, potash and nitrate in varying proportions were used, and to these were added 50 parts per million of the compound tested. The neutralized nucleic acid as well as its nitrogenous decomposition products, hypoxanthine and xanthine, had a beneficial action on the plants, promoting growth and decreasing the nitrate absorption. The plants appear to be able to utilize these compounds directly in their metabolism and require under these circumstances less nitrate for maximum growth.

M. X. SULLIVAN: *Origin of Creatinine in Soils.*

Of samples of the same soil planted and unplanted kept side by side in the greenhouse, the water and glycerine extracts of the planted soils gave larger amounts of creatinine by the creatinine zinc chloride method. It would seem that the increase in the amount of creatinine was connected in some way with plant growth. Creatinine was found in small amounts in the water in which wheat seedlings had grown, in wheat seeds, wheat seedlings, wheat bran, rye, clover, alfalfa, cowpeas and potatoes. Besides the possible production of creatinine by microorganisms and the introduction into soil in the animal excreta of stable manure, the creatinine of soils has its origin in vegetable matter.

EDMUND C. SHOREY: *Nucleic Acids in Soils.*

Nucleic Acids have been obtained from soils by extraction with dilute sodium hydroxide, neutralizing and concentrating under reduced pressure, acidifying with acetic acid and addition of several volumes of alcohol as a light-colored amorphous

body which on hydrolysis gave pentose sugars, purine bases, pyrimidine compounds, levulinic acid and phosphoric acid. Xanthine and hypoxanthine were identified among the purine bases and cytosine among the pyrimidine compounds.

AUBREY V. FULLER: *The Biological Oxidation of Sodium Arsenite in Solution.*

The author has shown that sodium arsenite in solution may undergo practically complete oxidation to arsenate through the agency of a micro-organism or—organisms as yet not identified. The organisms differ from the nitrifying bacteria of Winogradsky in that this activity is evidenced only in the presence of ordinary culture media, such as meat infusion.

G. A. RUSSELL: *The Effect of Mold on the Chemical Composition of the Fixed Oil from Brazil Nuts.*

C. F. LANGWORTHY and R. D. MILNER: *An Improved Form of Respiration Calorimeter and its Use for the Study of Problems of Vegetable Physiology.*

W. E. TOTTINGHAM: *The Influence of Bacteria on the Soluble Phosphorus of Manures.*

Relevant to a project embracing study of reactions between farm manure and reinforcing substances, such as feldspar, rock-phosphate and peat, investigation of fermenting manures has shown in all cases decrease of water-soluble phosphorus. Fermenting mixtures of manure and rock-phosphate have shown greater decreases than manure alone. A typical experiment with mixed cow and horse manure fermented six months without and with rock-phosphate (25 lbs. fresh manure and $\frac{1}{2}$ lb. rock-phosphate) involved 16.45 grams soluble phosphorus in the manure and 18.49 grams in the phosphate mixture at the start. The water-soluble phosphorus of the manure decreased from 86.7 per cent. to 65.6 per cent. of the total, a decrease of 24.3 per cent. of the original water-soluble phosphorus. The sample with phosphate gave a decrease from 34.3 per cent. to 14.7 per cent. of the total phosphorus, a loss of 57 per cent. of the water-soluble phosphorus. Common solvents for inorganic phosphates, such as carbonated water, ammonium citrate solution and $N/5$ nitric acid recovered the depressed phosphorus only partially.

Two and one half months standing with and without antiseptics produced the following changes of water-soluble phosphorus in manure-rock-phosphate mixture. Normal fermentation; decrease from 33.26 to 17.64 per cent. of total. Saturated with chloroform; decrease from 32.61 to 28.11 per

cent. Saturated with formaldehyde; decrease from 29.36 to 26.85 per cent. The losses amounted to 47.0, 13.8 and 8.5 per cent., respectively, of the water-soluble phosphorus. The results seemed to indicate that the losses observed were not due primarily to "reversion" of inorganic phosphates, but chiefly to bacterial activity.

Manure bacteria grown on media prepared from extract of fresh manure-rock-phosphate mixture reduced the soluble phosphorus of the media 23.8 to 63.6 per cent. Fresh intact bacterial cells of specific organisms and manure flora contained 34 to 53 per cent. of their phosphorus in water-soluble form. Drying in vacuo at room temperatures did not alter the solubility of the phosphorus appreciably. The residual phosphorus was partly recovered from crushed cells by water and did not appear especially resistant to 0.2 per cent. acid or alkali solvents. These results appear to point conclusively to bacteria as the chief cause of loss of soluble phosphorus in fermenting manures.

Further work is in progress with acid-phosphate and involving also the rôles of soil organisms and the plant in rendering phosphorus of manure bacteria available to crops.

JOHN H. LONG: *A Series of Complete Urine Analyses.*

This paper is a study of the urine of a number of men in normal health and on a protein diet amounting to from 70 to 88 grams daily. The results, presented in tabular form, embraced determinations of the bases calcium, magnesium, sodium, potassium and ammonium and the important acids present.

For each urine the various acid and basic ions present were reduced to the hydrogen equivalent and these results shown in tables. While there was an apparent excess of acid in each case it was shown that with proper consideration of the probable urate and phosphate combinations some of the urine should exhibit an alkaline reaction toward litmus, as was, in fact, the case.

The results are from the mixed aliquots saved from urines collected through a period of about 35 days, and embraced a study of the nitrogen and other factors as well as the acids and bases.

JOHN H. LONG: *Some Further Studies on the Composition of Feces Fat.*

Some years ago attention was called by the writer to the rather large amounts of organic phosphorus compounds found in the fat of feces studied in his laboratory. This is a continuation of these examinations, and analyses were made of

the fats from the feces of six men collected through long periods. These analyses embraced not only a determination of the phosphorus, but numerous other factors as well. The means of the results obtained show that the phosphatide content of the fat is larger than usually stated in works on physiological chemistry.

OSWALD SCHREINER and J. J. SKINNER: *The Effect of Guanidine on Plants under Different Conditions.*

Guanidine is harmful to plants. The effect of 50 parts per million was tested on wheat seedlings in solution cultures and in soils. The solution cultures consisted of nutrient solutions of varying composition in phosphate, nitrate and potash. The toxicity of the guanidine does not show until the fifth or sixth day, when spots appear on the leaves and soon the plant is completely affected and by the end of the second week the tops fall over. The effect of nitrates in the cultures is especially striking in that the harmful effect first shows itself in the cultures highest in nitrate and spreads gradually to those lower in nitrates and frequently does not appear at all in those cultures which contain phosphate and potash but no nitrate. In other words, we have here the interesting case of a harmful nitrogenous constituent, the harmful effect of which is accentuated by nitrates. Nitrogenous compounds other than nitrates, such as asparagine, creatinine or stable manure, when used in conjunction with guanidine, did not produce the harmful effect noticed with sodium nitrate.

WILLIAM SALANT and J. B. RIEGER: *Further Studies on the Demethylation of Caffeine.*

Studies carried out on rabbits, guinea-pigs, dogs and cats show that demethylation in the carnivora takes place far more readily than in the herbivora, the amounts of caffeine eliminated unchanged by the former being very small. The process of demethylation therefore varies quantitatively as well as qualitatively in the above animals.

C. B. BENNETT: *Note on the Distribution of Inosinic Acid.*

Inosinic acid was isolated and identified from the fresh muscular tissue of pigeons.

L. E. WARREN: *A Note on the Poisonous Properties of Parthenocissus quinquefolia.*

The death of a child after eating the berries of the Virginia creeper was recently noted by the public press. While the recorded instances of poisoning from this plant are very few, an examination of the literature showed that oxalic acid has been found in nearly all parts of the plant.

Its quantity does not appear to have been determined, but, pending further investigation, the plant should be regarded with suspicion.

I. G. MCBETH and R. C. WRIGHT: *Certain Factors Limiting Nitrification.*

Two per cent. of glucose and two per cent. of starch disappeared from soil in less than seven days. Cellulose disappeared more slowly. The addition of glucose and starch caused a rapid disappearance of nitrate from eastern and western soils; with cellulose the reduction of nitrate was less rapid.

Two per cent. of fresh horse manure caused only a partial disappearance of soil nitrate. After seven days in eastern soil and twenty-one days in western soil nitrification became active, causing an increase in nitrate.

Nitrification took place rapidly in rotted manure; the addition of five per cent. of cellulose caused rapid denitrification.

Nitrification in the soil is inhibited by carbonates, chlorides and sulphates, the former having the strongest effect and the latter the least effect.

There are certain seasonal variations in the rate of nitrification in soil.

J. B. RIEGER: *Identification and Precise Estimation of Minute Amounts of Caffeine in Physiological Products.*

M. O. STAFFORD: *Preliminary Study of Iron Peptonates.*

V. K. CHESNUT: *Estimation of Small Quantities of Pepsin.*

M. LOUISE FOSTER: *A Study of the Decomposition Products of Milk Caused by B. lactis erythrogenes.*

Sterile milk inoculated at room temperature with *B. lactis erythrogenes* gave after a few days a faintly red solution, which on longer standing became blood red with coagulation of the milk. During standing—from two to six months—the red liquid became viscous, then fluid again with the formation of a white granular precipitate. The liquid was alkaline and gave the biochemical tests which showed that the organism had attacked the protein molecule as well as the carbohydrate. From 5 to 8.6 per cent. of the total native protein remained unattacked while the remainder was identified as proteoses and monamino acids. The pigment was extracted with amyl alcohol and precipitated with acetone in clusters of red crystals. Further, colorless crystals with alkaloidal odor were obtained. An enzyme was isolated in the usual way. It was found to coagulate milk, giving

a supernatant liquid acid to litmus. This acidity was found to be due to the presence of acetic and formic acids. No lactic acid was found.

OLIVER E. CLOSSON: *Local Anesthetics: Some Comparative Physiological Reactions.*

W. H. SCHULTZ and ATHERTON SEIDELL: *The Elimination of Thymol. I. Feces.*

A. B. MACALLUM: *The Rôle of Surface Tension in the Distribution of Salts in Living Matter.* (Illustrated with lantern slides.)

J. F. BREAZEALE and J. A. LEClerc: *The Influence of Reaction of Culture Medium on the Development of Roots of Wheat Seedlings.* (Illustrated.)

G. A. MENGE: *Some New Compounds of the Choline Type.*

CHARLES B. BENNETT: *Note on the Distribution of Inosinic Acid.*

OSCAR RIDDLE: *On the Chemistry of the White and Yellow Yolk of Ova.*

D. W. WILSON and P. B. HAWK: *On the Relation between Water Ingestion and the Ammonia, Phosphate, Chloride and Acid Concentration of the Urine.*

LAWRENCE T. FAIRHALL and P. B. HAWK: *The Fecal Amylase Output during Fasting and Water Drinking.*

D. W. WILSON, P. E. HOWE and P. B. HAWK: *The Distribution of Urinary Nitrogen as Influenced by the Ingestion of Moderate and Copious Quantities of Distilled Water at Meal Time.*

CHARLES O. APPLEMAN: *Metabolism in Dormancy of Tubers.*

A. D. EMMETT and CARL CHRISTOPHER: *Effect of the Quantity of Protein Ingested on the Nutrition of Animals. V. On the Chemical Composition of the Skeleton of Swine.*

The skeleton of pigs, selected from three lots—fed on low, medium and high protein planes—showed: (a) that the percentage of fat varied with the protein fed; (b) that the per cent. of protein was lowest in the low-fed lot and the same in the other two; (c) that the per cent. of ash and phosphorus seemed to be independent of the feed. With the tibia, femur and humerus bones, their weight, length, diameter, breaking strength and modulus of rupture seemed to suggest that the medium-fed pigs had the most compact and firm bones. The weight of the skeleton was greatest percentage in the low-fed lot.

A. D. EMMETT and H. S. GRINDLEY: *The Relative Nutritive Value of the Cuts of Beef.*

Comparing the protein and fat content of the

edible meat of the eleven wholesale cuts of beef obtained from three steers—the flank, plate, rib, rump and loin were highest in fat, and the clod, round and shanks in protein. Fat made up from 68 to 92 per cent. of the total calorific value. The energy varied directly as the percentage of fat, ranging from 235.1 calories in the clod to 554.9 in the flank. Comparing the grams of meat required to supply 100 calories from the fat and protein, it takes about half as much of the fatter cuts. The most economic cuts from this standpoint are the chuck, plate, clod and shanks.

E. W. MORSE and L. W. FETZER: *The Present Knowledge in Regard to the Nature of Peach Yellows Disease.*

Summing up our present knowledge in regard to the disease of peach trees known as yellows, it seems natural to conclude that this is a constitutional disease which is inheritable; that is, the progeny have inherited a hypersusceptibility to the disease. The symptoms of the disease—premature ripening of the peach and the appearance of superficial red spots and streaks throughout the flesh of the same, and a yellowing of the leaves the following spring, etc.—seem to point to the hypothesis that the disease is a metabolic one, due to a disturbance of the equilibrium among the enzymes of the plant. Probably there is a hyper-production of the oxidases and a lesser production of the other enzymes, which are active during the life cycle of the plant.

A. R. ROSE: *The Influence of Phytin on Seedlings.*

Phytin has been found universally present in seeds and by some investigators considered to play a significant rôle in germination and early growth of plants and the growths of animals. Nagaoka, Aso and Yoshida in the Imperial Agriculture College in Tokyo have shown that the phosphorus of plants are less beneficial to plant growth than that from animal scraps and wastes, also that the soluble organic phosphorus gave poorer ultimate results as fertilizer material than lecithans and the various inorganic forms of ortho-phosphates except AlPO_4 and FePO_4 . In view of this, experiments were planned and executed to determine, if possible, what the influence of these phosphorus compounds may be upon the earliest growth of the plants. Lupin seedlings were germinated and afterwards allowed to grow in nutrient solutions, some of which contained a phytin compound, for periods of two or more weeks and the influence on the primary root noted. The results seemed to indicate that the several phytates behaved in the

same manner as the corresponding ortho-phosphates. There was no suggestion of any specific influence of the phytic anion upon the seedlings. The phytin solutions in which the seedlings had grown showed no increase in inorganic phosphorus nor inositol and there was therefore no evidence that the phytase of the seed acted upon the phytin in the surrounding liquid. The author contemplates further experiments along this line.

A. R. ROSE and J. T. CUSICK: *The Influence of Phosphorus Compounds on the Yield and Composition of Goat's Milk.*

A preliminary report of a metabolism experiment, the fifth of a series planned by Director Jordan. The former experiments conducted with cows gave interesting results with respect to the milk flow and composition. There was a consistent increase of fat and decrease of milk volume with the increase of phosphorus over a very low phosphorus ration, and *vice versa*. The other constituents of the milk were not appreciably affected. A recent paper by Fingerling gives results contrary to these conclusions, but he used goats and his rations were of different constituents in the high and low phosphorus periods. The data from this experiment tend to confirm the conclusions of the previous experiments at this station and are not at all in harmony with Fingerling's observations, but the results are not as consistent as were those when cows were used. There is a regular parallelism between the milk flow and the various constituents of the milk, except with respect to the fat. In two of the four periods the fat increased and the milk flow decreased with the increase of phosphorus in the rations; in the other two periods the reverse was true. Further investigations are now in progress at this station.

A. R. ROSE: *The Toxicity of Phytin.*

A series of experiments conducted on rabbits weighing approximately 2 kilograms gave in two cases unexpected results. Feeding five grams of the sodium salt of phytin was followed in one and one half hours by death. Analysis of the stomach and intestinal content yielded almost half of the soluble organic phosphorus administered. Death was therefore apparently due to 3.2 grams and 3.66 grams sodium phytate, or 1.7 grams per kilogram.

Methods used and an improved cage described.

H. M. ADLER: *Vicarious Fat Deposits in Rabbits Chronically Poisoned with Oil.*

A. A. EPSTEIN and S. BOOKMAN: *Studies in Glycolipid Formation in the Body.*

ALBERT A. EPSTEIN: *Contribution to the Study of Blood Serum and Serous Effusions.*

The composition of blood sera varies in disease. The changes which occur require careful analysis in close relation with the pathology of the disease investigated. The relation of disease to the production of changes in the chemical composition of the blood, and, also, the relation of alterations in the blood to the production of disease are subjects requiring special study. The effusions present distinct chemical differences, depending upon the site of their production, the nature of the underlying disease and the chemical composition of the blood.

ALBERT A. EPSTEIN: *Immuno-chemical Studies on Peptones.*

The different peptone fractions seem to be able to alter the different blood elements sufficiently to affect their immunological reactions. This power is not possessed by all the peptones equally, either qualitatively or quantitatively. If we regard the phenomenon of hemolysis by immune serum in the light of a biochemical process, depending upon properties possessed by certain constituents of the serum and the red blood cells, the albumoses and peptones show differences in their behavior toward the elements concerned in the production of hemolysis.

THEO. KUTTNER: *Some Findings in Two Cases of Bismuth Poisoning.*

The urine of patients to whom bismuth subnitrate and bismuth subcarbonate had been administered was found to contain bismuth. It is commonly supposed that the organism does not absorb these bismuth compounds.

W. A. WITHERS and B. J. RAY with the collaboration of R. S. CURTISS and G. A. ROBERTS: *Studies on Cotton-seed Meal Intoxication. I. As to Pyrophosphoric Acid.*

JAMES N. CURRIE: *Studies on the Flavor of the Green Mold Cheeses.*

A study of the volatile fatty acids of the green mold cheeses, Roquefort, Gorgonzola and Stilton, shows that the fat undergoes a marked hydrolysis during the ripening process. This change is doubtless accomplished by a lipolytic enzyme of *Penicillium roqueforti*, which, according to Thom, is concerned in the ripening of all of these cheeses. The characteristic peppery taste of the green mold cheeses may be, at least partially, ascribed to an accumulation of caproic, caprylic and capric acids, or their readily hydrolyzable ammonium salts.

H. P. BASSETT: *Transformation of the Fruit Acid by Animal Enzymes.*

WILLIAM H. WALKER: *Electrical Apparatus for Use with Benedict's Method for the Determination of Urea.*

MAX KAHN: *On the Absorption and Distribution of Aluminium from Aluminized Food.*

When biscuits baked with alum baking powder are fed in a mixed diet to dogs, aluminium passes in considerable amounts into the blood.

Such absorbed aluminium circulates freely and tends to accumulate to some extent in the various organs.

Aluminium is partially excreted by the liver in the bile and is also eliminated in the urine.

CHARLES H. SANFORD and JACOB ROSENBLUM: *On the Glycyltryptophan and Tryptophan Tests for Cancer of the Stomach.*

T. B. ALDRICH: *On Feeding Young Pups the Anterior Lobe of the Pituitary Gland. I.*

Seven pups, five females and two males, as soon as weaned were separated into two groups A (4), B (3), weighed and fed on bread and milk only for eight days. They were then reweighed and each pup in group A received daily in addition to his milk and bread diet 50-75 mg. of the fresh desiccated, defatted anterior lobe of the pituitary gland; each in the other group received an equal amount of desiccated, defatted ovary. The pups were weighed usually every fourth day and the weights recorded in tables and charts. The experiment extended over nearly four months. These records show that the controls increased in weight faster than the pituitary-fed pups. One pituitary-fed pup weighed the most; but the group curve shows the controls had much the advantage. These observations are not in accord with Professor Schafer's findings, who found that the anterior lobe stimulated the growth of young rats. Further experiments are necessary to decide whether the anterior lobe has a stimulating action or not on young animals.

I. K. PHELPS and C. S. HUDSON: *A New Crystalline Product from Yeast.*

F. C. WEBER and H. W. HOUGHTON: *Notes on a Few Chemical Methods for the Detection of Deterioration in Flesh Foods.*

CHARLES B. LIPMAN: *The Toxic and Protective Effect of Salt as Related to Soil Bacteria.*

BURTON E. LIVINGSTON: *Incipient Drying in Plants.*

When water loss from the exposed membranes of leaves occurs at a rate higher than that at which

water of imbibition enters these membranes from within, then the surfaces must begin to dry. This phenomenon, which may be termed *incipient drying*, actually occurs in leaves which are subjected to relatively high transpiration. It acts as an automatic check upon transpiration. These considerations are important in the study of the water relations of plants; they also seem to bear upon the physics and chemistry of the formation of cuticle, etc.

M. MCCOOL: *The Toxic and Antagonistic Relations of Manganese.*

JOINT PROGRAM OF THE BIOLOGICAL SECTION OF THE
AMERICAN CHEMICAL SOCIETY AND THE AMERICAN
SOCIETY OF BIOLOGICAL CHEMISTS

THOMAS B. OSBORNE and L. B. MENDEL: *Maintenance and Growth.*

WILDER D. BANCROFT: *The Study of Environment.*

When studying the effect of environment on an organism, we must distinguish three distinct things: the direct effect of new external conditions involving no adaptation; the adaptation of the organism to the new conditions; and the possible inheritance of the adaptations. The botanists have not made these distinctions. They consider the change of curvature of tendrils with change of temperature as a case of non-adaptive response, whereas it has no more to do with adaptation than the shortening of a fishing-line when it is wetted.

The problem of the inheritance of acquired characters has been complicated unnecessarily by the arbitrary limitation that the character must be inherited for four or five generations after the organism has been brought back to the original surroundings. Since an organism which responds readily to a new environment will also revert readily when brought back, this definition has probably excluded most of the cases in which the inheritance of acquired characters could be shown. The biologists seem never to have realized that inheritance is primarily a hysteresis phenomenon and should be studied as such.

TREAT B. JOHNSON: *The Synthesis of Thiotyrosine.*

A knowledge of this new amino acid was especially desirable, in order to acquire a more definite conception of the true nature of sulphur combinations in proteins. The acid has been prepared by the application of a new, general method for the synthesis of alpha amino acids and its chemical properties are now being studied.

The most important characteristic of the acid, so far observed, is the fact that it does not give

Millon's test. On the other hand, it gives, on warming the concentrated sulphuric acid, as characteristic color reaction, as the Milton's test is characteristic for tyrosine. This study is one of a projected series on new sulphur combinations which has been planned for the Sheffield Laboratory.

ALFRED DACHNOWSKI: *The Relation of Vegetation to the Chemical Nature of Peat Soils.*

C. L. ALSBERG and O. F. BLACK: *Phytochemical Studies on Hydrocyanic Acid.*

J. H. LONG: *The Definition of Normal Urine.*

Our notions as to what is a normal urine have undergone many changes in the years which have elapsed since the first attempts were made to establish standards.

The same individual, at one time on a high protein diet and again on a low protein diet will excrete urine which will be markedly different in many ways, and yet both will be normal.

Improved methods of examination have shown that hyaline casts are much more frequently present in the urine of healthy men than was suspected a few years ago, and it must be admitted that traces of albumin occur in the urine of men who, from all ordinary points of view, are perfectly well.

The statement as to what constitutes normal urine must take cognizance of these facts, and of the further fact that for each individual there seem to be agencies at work which modify the nitrogen distribution, the acidity and the natural sulfur in ways which we can not account for. In a certain sense each individual has his own standard of normality.

ANDREW HUNTER and MAURICE H. GIVENS: *The Nitrogen Excretion of the Monkey, with Special Reference to the Metabolism of Purines.*

A female monkey (*Cercopithecus callitrichus*), weighing 4.7 kilograms, was maintained for 40 days on a daily ration of 200 c.c. whole milk, 200 grams bananas and 20 grams peanuts. The urine was collected every 48 hours. For the first 16 days the average daily excretion of N was 1.83 grams, distributed as follows: urea, 1.59; NH_3 , 0.028; creatinine, 0.065; allantoin, 0.015; purines, 0.0027; undetermined, 0.13 gram N: or, urea 86.9; NH_3 , 1.5; creatinine, 3.5; allantoin, 0.82; purines, 0.15; undetermined 7.1 per cent. of the total N. Uric acid could not be detected.

During the remainder of the experiment attention was devoted particularly to the metabolism of endogenous and exogenous purines. On seven

normal two-day periods the excretion of allantoin N ranged from 27.0 to 31.8, that of purine N from 4.7 to 10.3 milligrams. On five periods, each interpolated between two normal ones, doses of 0.5, 0.5, 1.0, 1.0 and 2.0 grams sodium nucleate were administered. Of the purine N thus fed 90, 56, 41, 24 and 29 per cent., respectively, of the theoretically possible was recovered in the form of allantoin and urinary purines. Of the amount so recovered 79 to 98 per cent. took the form of allantoin; after the second dose of 0.5 gram 2 per cent., and after 2.0 grams 9 per cent. appeared as uric acid. In normal periods allantoin accounted for 71-87 per cent., in nucleate periods 77-86 per cent. of the total purine-allantoin N. In respect of the ratio between allantoin and purine excretion the species examined resembles the lower mammals rather than man. On the other hand, we did not meet with the almost quantitative conversion of exogenous purines into allantoin, which has been reported for the dog.

H. S. REED and H. S. STAHL: *Oxidizing Enzymes in Certain Fungi Pathogenic for Plants.*

The oxidizing ability of the plant extract is often altered as a result of the invasion of parasitic fungi. The extracts of apples invaded by *Sphaeropsis malorum* show no oxidizing powers whatever. Apples attacked by *Glomerella rufo-maculans* show, on the contrary, a somewhat increased oxidizing ability. When grown in pure culture on synthetic media *Glomerella* develops oxidizing enzymes in certain media but not in others.

WALDEMAR KOCH: *Should the Term Protagon be Retained?*

Data were presented which indicated that the preparations referred to as protagon contain at least three substances: a phosphatid containing cholin, a cerebrosid containing sugar, a complex combination of a cholin-free phosphatid with a cerebrosid to which an ethereal sulphuric acid group is attached. The term protagon can not, therefore, be said to have any chemical significance. The details will be presented in a more extended publication.

WILLIAM J. GIES: *Modified Collodion Membranes for Studies of Diffusion.* (From the Laboratory of Biological Chemistry of Columbia University, at the College of Physicians and Surgeons, New York.)

Lipins and many substances which dissolve in ether, alcohol and similar solvents can be dissolved, in large proportions, in U. S. P. collodion solution.

Such mixed solutions, when treated in any of the usual ways for the production of collodion membranes, yield composite homogeneous products. Lecithin, cholesterol, lard, olive oil, rubber, alcohol-ether-soluble protein, organic pigments, ferric sulfocyanate and many other substances have been incorporated homogeneously in such modified collodion membranes, which show interesting differences in permeability.

MORRIS S. FINE: *A Method for Differentiating between Metabolic and Residual Food Nitrogen of the Feces.* (From the Sheffield Laboratory of Physiological Chemistry, Yale University, New Haven, Conn.)

As a rule the methods previously employed for this purpose have not taken into account the fact that the indigestible materials, *e. g.*, cellulose and hemicellulose such as are present in cereals, legumes, etc., show a marked tendency to increase the elimination of fecal material. The following procedure is believed to offer certain advantages over those hitherto proposed. From the fecal nitrogen accruing from a given diet is subtracted the corresponding value resulting from a *non-nitrogenous diet, yielding practically the same amount of feces.* Such a non-nitrogenous diet may be conveniently obtained by adding agar agar to non-nitrogenous food whose calorific equivalent does not differ materially from that of the diet under investigation. The result thus obtained represents the amount of nitrogen of the latter diet which has *actually escaped utilization.*

E. MONROE BAILEY: *Biochemical and Bacteriological Studies of the Banana.*

An earlier study¹ has been extended. Enzymes concerned in ripening processes have been investigated, and in addition bacteriological and chemical examinations of the fruit in various stages of maturation have been made. Amylase, sucrase, raffinase, protease, lipase and peroxidase were detected. Tests for maltase, dextrinase and lactase were doubtful or negative. The inner portions of the pulp of sound fruits appear to be sterile, but the regions of the inner coats of the peel may be sparsely inhabited by bacteria. As ripening progresses, starch disappears and the content of alcohol-soluble sugars and dextrins increases. Maltose could not be detected.

CHARLES L. PARSONS,
Secretary

(To be continued)

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