ture is due to the growth of the cortex on the lower side of the stem.

7. It is known that the geotropic "stimulus" can travel around a corner, *i. e.*, around an incision through half the thickness of the stem, which is to be expected if the "stimulus" consists in the flow of a liquid. If such incisions are made alternately across the upper and lower half of each internode of a horizontally suspended stem with only one leaf on the under side, the stem will show geotropic curvature if the leaf is in the apical node; but will show as a rule no curvature if the leaf is in the basal node; or a slight curvature in the neighborhood of the basal node may occur after considerable delay.

8. All these experiments agree with the assumption that each leaf sends a current of root-forming substances towards the base of the stem, and a current of shoot-forming substances towards the apical end of the stem; that the root-forming substances have a tendency to collect at the lower side of a horizontally suspended stem, and that they are associated or identical with the substances causing the growth of the cortex on the lower side of the stem to which the geotropic curvature is due.

9. This idea is further supported by experiments with stems split into two longitudinally. If such split stems are suspended horizontally only those halves show geotropic curvatures whose cortex is below. If the cortex is above (and the cut surface of the stem below) almost no geotropic curvature takes place, no matter where the leaf is, for the simple reason that such stems are lacking the cortex on the lower surface. If the cortex is below and one leaf left at the apical end, root-formation will take place just as rapidly as in the intact stem and geotropic curvature still more rapidly (since the passive resistance of the upper half is removed). If, however, the leaf is left at the basal end, in about 50 per cent. of the cases no geotropic curvature takes place, or if it takes place it is confined to the region of the basal node; and is considerably less than if the leaf is left at the apical end.

If the pieces have no leaf they will bend more strongly than when a leaf is left at the basal end only, thus indicating a possible inhibiting influence of the basal leaf upon the curvature in the more apical regions of the split stem.

10. All these facts suggest a close association if not identity between the root-forming substances and the substances (or hormones?) causing geotropic curvatures. Such a close association or identity between organ-forming and geotropic substances might also explain why it is that in some cases geotropism can restore the form in the same way as does regeneration, as, *e. g.*, in certain fir trees, where one of the upmost horizontal branches will begin to grow vertically when the apex is cut off.

JACQUES LOEB
THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
NEW YORK

THE AMERICAN CHEMICAL SOCIETY

THE 52d meeting of the American Chemical Society was held at the University of Illinois, Urbana-Champaign, April 17 to 21, 1916. The meeting was an unusually enthusiastic one, the total registration being the largest to date, namely, 728. A detailed description of the social and other events of the meeting will be found on page 396 of the *Journal of Industrial and Engineering Chemistry* for May, 1916. The general meeting and meetings of the Divisions of the Society were held in the lecture rooms of the chemistry building of the University of Illinois. Some notable features were presented in the "Special Program for Home Economics" by the Division of Biological Chemistry; in the "Symposium on the Activated Sludge Method of Sewage Purification," by the Division of Water, Sewage and Sanitation, and in the "Symposium on the Chemist in Food Control," by the Division of Agricultural and Food Chemistry.

The following general addresses were given:

The Composition of Corn as affected by Nineteen Generations of Seed Selection: L. H. SMITH. (Lantern.)

The Manufacture of Chemical Apparatus in the United States: ARTHUR H. THOMAS.

The War and the American Chemical Industry: RAYMOND F. BACON.

On the Influence exerted by Electrolytes on the Equilibrium of Emulsions, Jellies and Living Cells: G. H. A. CLOWES. (With demonstration.) (Lantern.)

Some Effect of High Pressures: John Johnston. (Lantern.)

Public Lectures. Complimentary to the citizens of Champaign and Urbana.

Charles L. Parsons, "Production of Radium," illustrated by lantern slides and moving pictures.

Curtis F. Burnam, "Use of Radium in Treatment of Cancer," illustrated.

All divisions of the society held well-attended meetings. The titles of papers presented follow with abstract so far as abstracts could be obtained.

DIVISION OF AGRICULTURAL AND FOOD CHEMISTRY

L. M. Tolman, *Chairman*

Glen F. Mason, *Secretary*

Cattle Foods: Carl S. Miner.

Starch and Glucose: A. P. Bryant.

The Chemist in the Canned-food Industry: W. D. Bigelow.

The canner, like other manufacturers, sometimes finds it advantageous to have miscellaneous supplies examined. The laboratory finds a greater field of usefulness, however, in determining the cause of and finding a means of preventing various kinds of spoilage and real and apparent inferiority. This sometimes involves the systematic study of methods of canning in order that the exact technique that will uniformly give the best results may be accurately defined. All this work requires an intimate knowledge of the technology of the industry. Laboratories frequently make serious errors in answering questions submitted by canners, because of an imperfect knowledge of the facts. Errors of this sort do great damage to the industry and work injury to the reputation of the chemical profession. Greater care on the part of chemists is urged in such matters.

The Chemical Control of Gelatin Manufacture: J. R. Powell.

Chemical control has been limited until quite recently, but when demanded by the advance in food requirements, its installation has proved of value to the manufacturer. This control covers the inspection of raw material and chemicals; the control of the actual manufacturing process, and the inspection of the finished product and by-products. Raw material is examined for its yields and the presence of interfering impurities. Manufacturing processes require such attention as will prevent the introduction of impurities, and the deterioration of the gelatin. The finished product is examined to judge its commercial value, and suitability for food purposes.

Flour: Harry Snyder.

The Removal of Barium Chlorid from Table Salt: W. W. Skinner.

A preliminary investigation by the Bureau of Chemistry showed that salts of certain grades contain considerable amounts of barium chlorid. As barium chlorid is a poisonous substance the use of such salt in food products is a menace to health. Therefore, the elimination from the market of salt containing barium chlorid in any appreciable quantity is highly desirable.

A method of treatment has been developed for the removal of the barium from the brine. This method depends upon the addition of sodium sulphate and calcium oxide in proper proportions and the blowing of air through the treated brine to decompose the ferrous bicarbonate, naturally present, thus obtaining a rapid precipitation. The method gave such promising results in the laboratory and from a test run of six days in the works, that one large salt manufacturer decided to try it out and installed the necessary equipment for the treatment of 200,000 gallons of brine per day. The treatment was begun in September, 1915, and has been in operation continuously ever since. The results so far obtained indicate that the process is a complete success. Ordinarily two and sometimes three grades of salt are produced. Since the installation of the process, however, the entire output of the plant has been of the No. 1 grade known to the trade as table and dairy salt. No off grade or No. 2 salt is produced. The cost of treatment is estimated at from 1¼ to 1½ cents per barrel. About sixty thousand barrels of salt containing only insignificant traces of barium have been produced by the new process.

Flavoring Extracts: George Lloyd.

The High Character of the Manufactured Foods offered the Public To-day: A. V. H. Mory.

Experience gained from careful examination of several hundred samples of manufactured food products, representing nearly all varieties, shows that adulteration and misbranding are seldom met with to-day in the goods of reputable producers, and that the adulteration that represents a serious menace to health is practically non-existent.

About the only service the laboratory of a large distributing house has been able to render is that of helping the expert buyers to select the best from a number of perfectly legal and wholesome products submitted for consideration; all of which is a testimonial to the present efficiency of law enforce-

ment made increasingly efficient by cooperation on the part of the reputable producer and distributer, who finds in the enforcement of these laws the elimination of unfair competition.

Preventing the Staling of Bread by Cooling in a Predetermined Atmosphere: ARNOLD WAHL.

Bread and like products absorb while cooling a considerable volume of gas from the atmosphere in which it rests, due to a vacuum caused by the physical condensation of the carbon dioxide in the pores of the loaf and by the solution of carbon dioxide in the free water of the bread, the solubility increasing as the product cools. Bread cooled in an atmosphere of oxygen becomes stale in a few hours while bread cooled in an atmosphere of carbon dioxide is so modified as to remain fresh for several weeks, the reason being that in the former case oxidation of the protein occurs similarly to the effect of oxygen on the nitrogenous constituents of beer, while in the latter oxidation is prevented. I prefer to employ carbon dioxide freshly produced by fermentation for this purpose, having been determined by long experience in brewing to be best suited to combine chemically with nitrogenous food substances.

Use of Picric Acid in Meat Sugar Solutions: W. B. SMITH.

Proteoses, peptones and the greater portion of the amino-acids are removed from meat extracts by excess of picric acid combined with excess of phosphotungstic acid in aqueous solution. More aminophosphotungstates are removed by adding hydrochloric acid to the filtrate.

Little free hydrochloric acid remains, permitting estimation of reducing sugar if quickly done. Bertrand's copper solutions and Low's iodid method are used. Total sugar is determined after inversion.

Mercuric acetate, followed by phosphotungstic and hydrochloric acids, gives the same results, but removal of excess mercury is essential. Picric acid does not interfere with reduction of Fehling's solution.

The Analysis of Maple Products VIII. The Application of the Conductivity and Volumetric Lead Subacetate Tests to Maple Sugar: J. F. SNELL AND G. J. VAN ZOEREN.

A representative sample of the sugar, say 100 grams, is dissolved in hot water, boiled to 219° F. (103.9° C.) and filtered through cotton wool. The resulting syrup is tested as directed in Papers VI. and VII. Pure products give conductivity values and volumetric lead values within the limits reported for genuine syrups in Papers VI. and VII.

Chinese Preserved Eggs—Pidan: KATHARINE BLUNT AND CHI CHE WANG.

Pidan is a kind of Chinese edible preserved eggs made by covering fresh ducks' eggs by a pasty mass of lime, wood ashes, salt and tea, and finally rice hulls. It is solid, the yolk and white still separate and very dark colored, and with remarkably ammoniacal odor. The moisture of pidan yolk is higher than that of fresh ducks' eggs, and of the white very much lower, hence water has been transferred from the white to the yolk and lost to the air. The ether extract of the yolk is low (only 21 per cent.) and its acidity high (8 per cent.). The ash is high and alkaline. Coagulable protein is lower than fresh hens' eggs, and, the most marked change, ammoniacal nitrogen by Folin's method is extraordinarily high (0.06 per cent. determined on the filtrate from the coagulable nitrogen).

A Study of American Beers to show the Effects on Their Composition of Various Raw Materials used in Their Production: L. M. TOLMAN AND J. G. RILEY.

DIVISION OF AGRICULTURAL CHEMISTRY

The Effects of Plant Foods upon the Amount and Quality of Substances used for Foods, particularly Fruit and Vegetables: H. A. HUSTON.

Does the Oxidation of Tetrathionate to Sulfur affect the Accuracy of the Estimation of Thiosulfate by Means of Iodine? PHILIP L. BLUMENTHAL AND S. D. AVERITT.

In neutral or barely acid solutions, an excess of iodine oxidizes tetrathionates to sulfates. Experiments showed an oxidation of 18 per cent. of the total sulfur in two weeks, with the excess of iodine as 2:1. Whenever thiosulfate is titrated with iodine, a small amount of sulfate is formed. This does not cause an appreciable error when N/10 solutions are used. In the analysis of lime-sulfur solutions by iodine titration, the volumetric results on thiosulfate agree very closely with the value obtained by oxidizing the tetrathionate with bromine weighing as $BaSO_4$. The sulfate formation noted might be due to presence of a little sulfite, but there is reason to believe none is present.

Separation and Estimation of Polysulfides and Thiosulfate in Lime Sulfur Solutions: S. D. AVERITT.

The quantitative separation of polysulfides preparatory to the determination of thiosulfate is accomplished by means of standard solutions of iodine or hydrochloric acid using appropriate indicators.

The precipitated sulfur from either titration may be weighed directly. A quick accurate method of weighing it is described.

It is shown that H_2S may be removed from a slightly acid solution by boiling without decomposing thiosulfate, also that tetrathionate is converted into thiosulfate by an excess of soluble sulfid, the latter decomposed with HCl, the H_2S removed by boiling and the thiosulfate titrated.

Sodium nitroprusside may be used as internal indicator.

Some Studies on Liquid Fertilizer: G. D. Beal and D. T. Englis.

The Detection of Lime used as a Neutralizer in Dairy Products: H. J. Wichman.

DIVISION OF BIOLOGICAL CHEMISTRY

C. L. Alsberg, *Chairman*

I. K. Phelps, *Secretary*

The following papers were read by title:

Mutarotation of Gelatine and its Significance in Gelatin: C. R. Smith.

Chemical Studies on the Decomposition of Red Oak by Fomes applanatus and of Red Spruce by Trametes pini var. abietis: E. J. Piper, C. J. Humphrey and S. F. Acree.

Some Observations on the Bacterial Metabolism of Sulfur Compounds: F. W. Tanner.

A Study of the Ethereal Sulphates of the Urine in Certain Chronic Diseases: J. Rosenbloom.

The Ammonia Content of Human Gastric Juice: J. Rosenbloom and Jena Miltan.

Some Auxoamylases: E. W. Rockwood.

The Non-Protein Constituents of Foods and Feeding Stuffs: H. S. Grindley and H. C. Eckstein.

Swine Feeding Experiments to determine the Nutritive Value of the Amino Acids: J. C. Ross.

Further Observations on the Surface Tension of Saponin Solutions: C. L. Alsberg and H. E. Woodward.

The Changes in the Amino-acid Nitrogen and Soluble Non-protein Nitrogen: R. S. Potter and R. S. Snyder.

Diet in its relation to the Treatment of Diabetes: E. E. Butterfield.

The Nitrogen Distribution in Certain Seeds: C. L. Alsberg and F. Brewster.

Phospholipins, Lecithin, Cephalin and Similar Substances: M. Louise Foster.

The Fate of Methylene Disalicylic Acid and Derivatives in the Body: R. A. Hall and E. D. Brown.

The Pharmacological Action of Citrates: R. A. Hall and R. E. Morris.

On the Esterfication of Amino Acids: H. H. Shonle and H. H. Mitchell.

Digest of Data on Mineral Substances in Diet: Grace MacLeod.

The Temperature of Potatoes while Cooking and a Method of Measuring Temperature during Cooking and Canning: R. D. Milner.

The Organic Phosphorus of Soil: R. S. Potter and T. H. Benton.

The Chemical Aspect of Photosynthesis in Plants: H. A. Spoehr.

The Growth of Isolated Plant Embryos: G. D. Buckner and J. H. Kastle.

A Chemical and Bacteriological Study of some Non-Pathological Gastric Residuums: C. C. Fowler, M. Leviné and S. B. More.

A Study of Eighty Samples of Gastric Residuums Obtained from Apparently Normal Women: C. C. Fowler and Z. Zentmire.

Relative Sensitivity of Some Commercial Litmus Papers: Arno Viehoever and Clare O. Ewing.

Blue, neutral, red litmus papers from nine American manufacturers and one foreign manufacturer were found to vary in sensitivity within very wide limits. Best results were obtained when the "blue" papers were of a dull or grayish blue color; the "neutral," a dull lavender or pinkish-violet; and the "red," a light pinkish red. It is considered that good papers should respond quickly to $N/500$ acid or alkaline solutions.

By means of a "spot test," in which one or more drops of the solution to be tested were superimposed on the test paper, thus in effect concentrating the solution, the reaction of solutions as dilute as $N/25{,}000$ (1: 500,000) H_2SO_4 and $N/2{,}000$ (1: 50,000) NaOH could be determined.

On the Determination of the Digestibility of the Constituents of a Mixed Diet: H. H. Mitchell and H. S. Grindley.

A method of determining the digestibility of the constituents of a mixed diet is proposed, based on the product-moment method of correlation. The daily intake of nitrogen from each food ingested is correlated with the daily excretion of nitrogen in the feces. Coefficients or regression of fecal nitrogen on each type of food nitrogen are then calculated, giving figures representing the average increase of fecal nitrogen for an increase in intake of 1 gram in meat nitrogen, bread nitrogen, etc. From these coefficients, the digestibility of the nitrogen of each of the foods ingested may be calculated. The digestibility of the fat, phosphorus, chlorine, etc., of the individual foods may be calculated in a similar fashion.

Feeding Experiments on the Nutritive Value of Casein: E. M. K. GEILING AND H. H. MITCHELL.

Casein boiled for 2 hours is still able to maintain adult mice for at least 50 days. Casein moistened and heated in an autoclave for 1 hour at 15 lbs. does not appear to lose its value for maintenance of adult mice. Four mice were maintained for 70 days and 2 for 84 days on a ration containing this product. Casein was digested with pancreatin and then treated with 9.5 volumes 95 per cent. alcohol. The filtrate, evaporated to dryness, was unable to maintain mice for longer than 30 to 40 days. Mice fed this product plus cystine returned to normal weight and condition. Substitution of cystine by flowers of sulfur had no beneficial effect.

The Hydrogen Electrode Potentials of Phthalate, Phosphate and Borate Buffer Mixtures: WM. MANSFIELD CLARK AND HERBERT A. LUBS.

The hydrogen electrode potentials of $M/20$ solutions of the following mixtures were measured at 20°.

Acid potassium or the phthalate—Hydrochloric Acid.
Acid potassium or the phthalate—Sodium Hydroxid.
Acid potassium phosphate—Sodium Hydroxid.
Boric acid and Kbl—Sodium Hydroxid.

The solids crystallize beautifully and are all free from water of crystallization. The acid potassium phthalate, as shown by Dodge, is an excellent substance for the standardization of the sodium hydroxid solution. The sodium hydroxid may be prepared sufficiently carbonate-free by a method outlined and the hydrochloric acid may be purified by distillation and is easily standardized. These mixtures then form a convenient system of buffer solutions to be used as standards in the colorimeter method of determining hydrogen ion concentrations.

Solutions of acid potassium phthalate alone have a strong buffer effect. This combined with the ease with which the substance can be prepared makes it an excellent standard for hydrogen electrode measurements.

A Colorimetric Method of Estimating Amylolytic Activity: VICTOR C. MYERS.

To 10 c.c. of 1 per cent. soluble starch solution add 9 c.c. of water and 1 c.c. of a solution containing the amylolytic enzyme (ptyalin, amylopsin, etc.). Digest at 38° C. At the end of some definite time, such as 30 min. (or appropriate intervals), 1 c.c. of the solution is removed, at once treated with 3 c.c. of saturated picric acid solution and 1 c.c. of saturated sodium carbonate and then heated in a beaker of boiling water for 15 minutes. After cooling, the solution is diluted to proper volume for comparison with a standard picramic acid solution in a colorimeter. From this the sugar formation (maltose), and, therefore, the amylolytic activity may readily be calculated.

The Colorimetric Determination of Glucose, Sucrose, Dextrin and Starch in Foodstuffs: V. C. MYERS AND A. R. ROSE.

A portion of a saturated picric acid extract of a 2–5 g. sample (*e. g.*, banana) is diluted with picric acid solution, so as to contain about 0.02 per cent. of soluble carbohydrates. Portions of 3 c.c. are heated with 1 c.c. of saturated sodium carbonate at 100° C. for 15 minutes and the color which develops matched against a standard solution of picramic acid. From the readings obtained and dilutions used, the reducing sugars (glucose, frutose) are readily calculated. Another 3 c.c. portion is heated for 5 minutes at 100° C. before the carbonate is added and then continued as above. This portion gives the sum of the glucose (and frutose) plus the inverted sucrose. Dextrin and starch are similarly determined after hydrolysis.

On the Citric Acid Production of Aspergillus Niger: JAMES N. CURRIE.

In a previous paper the author reported that many cultures of black aspergillus produced citric acid. For the purpose of this discussion the acid fermentation of this group of fungi may be considered as an oxidation process proceeding in three phases which may be represented by the following scheme:

Carbohydrate → citric acid → oxalic acid → carbon dioxide.

Under optimum conditions of growth the chief end product is carbon dioxide and only small amounts of citric and oxalic acids accumulate. Under restricted conditions of growth which may be obtained on synthetic media large amounts of free acids accumulate. Any one of fifteen cultures studied can be made to produce both oxalic and citric acids in various proportions, depending upon the conditions of culture and the particular strain of *A. niger* employed.

The chief object has been to ascertain under what conditions the largest yield of citric acid could be obtained. The largest yields were obtained on media to which calcium carbonate was added. This may be due to the effect of maintaining neutrality or at least a low hydrogen ion concentration in the media. Highest yields of calcium citrate were obtained on the following media:

Water	1,000	gm.
Saccharose	50	"
Sodium nitrate	2.0	"
Potassium dihydrogen phosphate	1.0	"
Magnesium sulphate	.25	"
Potassium chloride	.25	"
Ferrous sulphate	.01	"
Calcium carbonate	40	"

The form in which nitrogen is supplied and also the amount of nitrogen are the most important factors when growth is conducted in the absence of calcium carbonate. Cultures which produce no citric acid when grown in the above media with 3.0 grams of sodium nitrate per liter will produce very considerable amounts of citric acid if the sodium nitrate be reduced to 1.2 grams per liter.

The most favorable media found for the production of free citric acid was

Water	1,000	gm.
Saccharose	50	"
Ammonium dihydrogen phosphate	2.0	"
Magnesium sulphate	.25	"
Potassium chloride	.25	"
Ferrous sulphate	.01	"

On this media several strains of *A. niger* will produce almost pure citric acid with only traces of oxalic.

Growth was conducted on 50 c.c. of media contained in a 200 c.c. Erlenmeyer flask at 30° C. Cultures were examined at 6 to 10 days of age. The cultures employed were obtained from Dr. Charles Thom.

The influence of hydrogen ion concentration, the substitution of other sugars for saccharose and the influence of numerous inorganic salts on this reaction have been studied but can not be reported in detail at this time.

The Equation of Fermentation of Glucose by Bacillus coli communis: Oliver Kamm.

The acid, alcohol, gas fermentation of glucose by *B. coli*, as given by Harden,[2] was found to be a combination of several fermentations. In particular, the lactic acid fermentation was found to proceed independently. In the absence of most inorganic salts and especially of phosphates, evidence was obtained that the gas formation (carbon dioxide and hydrogen) is due to the secondary fermentations of formic acid.

The Liberation of Ammonia from Ammonium Salts by B. Coli Communis: Robert Bengis and A. R. Rose.

A synthetic medium containing ammonia lactate and ammonia phosphate was used in growing *B. Coli communis* in quantity. The bouillon, when aerated, lost appreciable amounts of NH_3 and the amount that could be removed in this way was increased by inoculation with *B. Coli communis*. In agar media the amount of ammonia given off under sterile conditions was very minute, but upon inoculation with *B. Coli* more NH_3 was liberated than in the bouillon media.

[2] *J. Chem. Soc.*, 79 [1], 610–28.

The Change in Urinary Constituents following the Feeding of B. Coli Communis: Arthur Knudson and A. R. Rose.

The dogs were kept on a basal ration for long periods. This ration consisted, in part, of a fixed amount of bouillon which was inoculated at stated intervals with *B. Coli communis*. There was a rapid increase of indican and etherial sulfur eliminated in the urine following the inoculation of the bouillon, but these gradually decreased for a period of 2 to 3 weeks to the status of the normal periods, though *B. Coli* was still introduced. After a period of rest from *B. Coli*, the inoculation again produced an increase in these two constituents in the urine of the dogs, with the same gradual decrease. Other changes were noted.

The Analysis of the Urine as a Part of the Physical Examination of the College Student: G. O. Higley, E. T. Lowrey and C. T. J. Dodge.

This work was begun in September, 1915. From the urine voided by the student at the close of the physical examination a sample was taken and tested for albumen and dextrose and, in some cases, for other pathological substances. If any such substance was found, the student was advised to consult a physician. Also, the student's urine was reexamined twice, at intervals of a month or so, if found necessary.

Of 426 students who took the test, the urine of 15 showed albumin in two successive tests, and 5 showed sugar. A strong test for bile was obtained in one case. This work will be continued next year.

Plant Immuno-Chemistry: R. W. Thatcher.

The question as to whether there is in plants a series of phenomena comparable to those of antibodies in animals has not yet been settled, but is now being investigated. Two general methods of investigation are being employed: (*a*) a comparative biochemical study of the composition of healthy and diseased plants, and (*b*) a biochemical and microchemical study of the reactions produced in the host by the growing parasite. Sufficient progress has been made to justify the recognition of two types of resistance, or immunity; (*a*) an antagonism of the tissue substances of the infected plant to the action of the enzymes or other agents excreted by the growing hyphæ of the parasite, and (*b*) a hyper-sensitiveness of the host, whereby its tissues at the point of entrance of the

parasite are killed and no longer supply nutrient material for the latter, thereby causing its death by starvation.

The Presence and Origin of Volatile Fatty Acids in Soils: E. H. WALTERS.

In a recent examination of a sample of Susquehanna sandy loam soil from Texas acetic acid and propionic acid have been isolated and identified. The soil was found to contain approximately 41 parts per million of acetic acid and 13 parts per million of propionic acid.

In determining the kinds and amounts of volatile acids produced during the decomposition of green manure it was found that 98.5 c.c. *N*/10 acetic acid and 49.5 c.c. *N*/10 propionic acid were produced from 100 grams of rye when this amount of finely ground material was mixed with one kilogram of soil and allowed to decompose for six months under optimum moisture conditions in a loosely covered jar. During the decomposition of alfalfa under similar conditions it was found that 44.6 c.c. *N*/10 acetic acid and 35.4 c.c. *N*/10 propionic acid were produced from 100 grams. Methods used in the isolation and estimation of these acids are described in detail.

On the Reaction of the Pancreas and other Organs: J. H. LONG AND F. FENGER.

These investigations are in part a continuation of those reported at the Seattle meeting. In a large number of qualitative tests it was found that the pancreas "press juice," obtained by centrifugal action, is constantly acid in the organs of hogs, beef and sheep. The P_H values, the hydrogen coefficient or potential, were found to vary within narrow limits, 5.5 to 5.7.

The livers of a number of animals and the press juice from the parotid glands of cattle were likewise found acid. An acid reaction was recognized also in the juice of the spleen of hogs, but the liquid from the thyroid was practically neutral. Some explanation of the possible reason for this variation in reaction is discussed.

The pancreas reaction is undoubtedly an important physiological phenomenon and the source of the acidity was found to lie in two directions. A complete quantitative analysis of the salts in the press juice shows that they consist largely of alkali phosphates, with potassium acid phosphate in largest amount. A combination of the various ions determined discloses the fact that the solution must have an acid behavior. Another source of acid reaction is found in the character of the nucleo-proteins present. Among these the α-proteid of Hammarsten is probably the most important.

Contributions of Chemistry to the Science and Art of Medicine: L. J. DESHA.

The fundamental relationship between chemistry and medicine is emphasized by a résumé of chemical contributions to progress in physiology, pathology, therapeutics, diagnosis, etc. Such contributions will be increased by providing more men adequately trained in both chemistry and medicine. The question is raised as to the feasibility of providing for regularly trained chemists a special one- or two-year course in those branches of medicine most intimately related to chemistry. A field for such men exists in teaching the new medical chemistry, in research, and particularly in the widening applications of quantitative methods in diagnosis.

Chemical Aids in Diagnosis. I. A Comparative Study of the Tests of Renal Function: L. J. DESHA.

A preliminary report is made including the data on thirty-six cases in which the Hedinger-Schlayer-Mosenthal test diet has been used. The normal standards and diagnostic advantages set forth by Mosenthal are in general confirmed. The Greenwald precipitation of the blood proteins has been successfully employed. Most cases with established nephritis show increased nonprotein nitrogen in the blood, but there appears no close relationship between this value and prospective fatal termination. The work is being continued to include the Ambard and other tests.

Oxalic Acid and its Salts in Foods and Spices: ARNO VIEHOEVER AND JOSEPH F. CLEVENGER.[3]

Information is given as to the presence and distribution of oxalic acid and its salts in foods and spices. Some of the data are taken from literature and some are the results of a special microscopical and microchemical investigation.

Oxalic acid is present in many of our daily foods, usually in the form of calcium oxalate. Very small amounts of oxalic acid have been reported in potatoes, cabbage and pickles, where its presence was not detected microscopically by us. No calcium oxalate has been found so far in peas, carrots, parsnips, kale, cranberries or any of the cereals.

A new specific microchemical reaction with resorcin sulphuric acid was applied.

On Some Proteins from the Jack Bean, Canavalia ensiformis: CARL O. JOHNS AND D. BREESE JONES.

When meal made from the Jack bean was extracted with 10 per cent. sodium chloride about 10

[3] Contribution from the Pharmacognosy Laboratory, Bureau of Chemistry, Washington, D. C.

per cent. of globulin was obtained by dialyzing the extract. This globulin was composed of two proteins which may be separated by fractional precipitation with ammonium sulphate. These are designated globulin A and globulin B. Globulin A was present in very small amount and gave the following figures: C = 53.35, H = 6.95, N = 16.62, S = 0.81, O = 22.27. Globulin B, which was the chief protein present, gave the following percentages: C = 53.21, H = 7.02, N = 16.77, S = 0.51, O = 22.49. The nitrogen in globulin B was distributed as follows: Humin nitrogen 0.30, amide nitrogen 1.40, basic nitrogen 3.17, non-basic nitrogen 11.53, total nitrogen 16.40.

An albumin of the legumelin type was also obtained from the Jack bean. This gave the following figures: C = 53.23, H = 6.99, N = 16.30, S = 0.87, O = 22.61. The nitrogen was distributed as follows: Humin nitrogen 0.23, amide nitrogen 1.16, basic nitrogen 3.73, non-basic nitrogen 11.18, total nitrogen 16.30.

On an Alcohol-Soluble Protein from Kafir-Corn, Andropogon sorghum: Carl O. Johns and J. F. Brewster.

About three per cent. of an alcohol-soluble protein was obtained by extracting kafir-corn meal with hot 70 per cent. alcohol. The purified protein gave the following percentages:

C = 55.41, H = 7.25, N = 16.38, S = 0.62, O = 20.34

The nitrogen distribution calculated from a Van Slyke analysis was as follows:

Humin nitrogen	0.17
Amide nitrogen	3.46
Basic nitrogen	1.04
Non-basic nitrogen	11.97
Total nitrogen	**16.64**

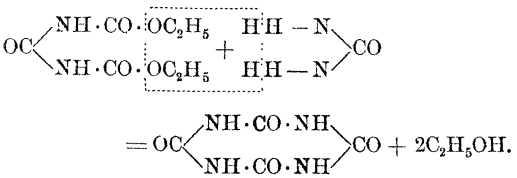
The distribution of the basic nitrogen, calculated to the per cent. of amino acids in the proteins, was as follows:

Arginin	1.58
Lysin	0.90
Cystin	0.78
Histidin	1.00
Tryptophan present.	

While this protein resembles zein from maize in its ultimate composition, it differs from zein which is lacking in lysin and tryptophan. Further investigations are in progress.

A Synthesis of Tetracarbonimid: David E. Worrall and Marion K. McNamara.

The oxidation of uric acid by hydrogen peroxide in alkaline solution results in the formation of tetracarbonimid. This substance has been synthesized in this laboratory by heating, in alcoholic solutions, molecular amounts of carbonyl dimethan and urea. The two substances slowly combine with the elimination of two molecules of alcohol



A Chemical and Bacteriological Study of some Non-Pathological Gastric Residuums: Chester C. Fowler, Max Levine and Sue B. More.

The contents of forty fasting human stomachs free from gastric symptoms were examined for free and total acid, pepsin, trypsin and bile. The volumes and physical characteristics were noted and the number and kinds of organisms determined by plating on wort agar and plain and glucose agar.

The stomachs fall into three groups: (*a*) practically sterile, (*b*) containing less than 2,000 organisms per c.c., (*c*) containing more than 4,000 per c.c.

There were three main groups of yeasts, (1) not producing gas from substance tested, (2) forming gas from glucose, fructose and galactose, (3) forming gas from these mono-saccharides and maltose.

Many of these yeasts formed acetyl-methyl-carbinol ($CH_3CHOH \cdot CO \cdot CH_3$).

A Study of Eighty Samples of Gastric Residuums obtained from Apparently Normal Women: Chester C. Fowler and Zelma Zentmire.

Sixty women were the subjects of this experiment. Twenty-one submitted to the collection of samples a second time; making a total of eighty-one samples.

The determinations made were: total and free acid, pepsin and trypsin.

The averages obtained were: volume 49.44 c.c., total acid 30.31 c.c. (*N*/10 alkali to neutralize 100 c.c. of juice), free acid 15.63 c.c., pepsin 3.32, and trypsin 5.22.

A marked constancy in the residuum of the same individual at different times was noted. In general the results of Fowler, Rehfuss and Hawk obtained on men at Philadelphia were confirmed.

Charles L. Parsons,
Secretary

(*To be continued*)