being distinguished from the Elasmobranchii (Selachii) by: the development of true scales and of two related structures—articulated fin rays and membrane bones, the latter including an opercle covering the branchial clefts; the reduction of the interbranchial septa; the presence of a developed air-bladder or lung, of two external nostrils on each side; the lack of pelvic claspers (mixipterygia), etc. The Teleostomi, as Mr. C. Tate Regan[1] has recently stated, "may be arranged in two series: in the Actinopterygian series (Chondrostei and Teleostei) the duct of the air-bladder opens dorsally or dorsolaterally into the alimentary canal, the branchiostegals retain their primitive serial arrangement, and the supports of the paired fins are either in the form of a series of parallel pterygiophores each of which is segmented into a basal and a radial portion or are modified from this plan by a simple process of concentration and reduction; in the Crossopterygian series (Crossopterygii and Dipneusti) the opening of the pneumatic duct is ventral, the branchiostegals are replaced by a pair of gular plates, and the paired fins are more or less lobate, with their supports tending to the biserial arrangement with axial basalia." The first of these two series, the primary subdivisions of the Teleostomi, is known as the Actinopterygii or Actinopteri; the second series apparently has received no definite name. As both morphological and paleontological[2] evidence indicate the monophyletic naturalness of this group, it should receive a distinctive designation; to indicate its similarity and relationship with the primitive Amphibia, this group, comprising the Crossopterygii and the Dipneusti (Dipnoa), may be termed Amphibioidei.

The taxonomic rank to which the Amphibioidei may be assigned is largely a matter of personal opinion. The writer would classify the group in serial arrangement among other chordates as follows, leaving out of consideration several groups wholly extinct and of doubtful affinities (of these the Arthrodira or Arthrognathi have often been regarded as related to the Dipneusti or the Crossopterygii):

Subphylum Euchorda.
  Superclass Pisces.
    Class Marsipobranchii.
    Class Elasmobranchii.
    Class Teleostomi.
      Subclass Actinopterygii.
        Superorder Chondrostei.
        Superorder Holostei.
        Superorder Teleostei.
      Subclass Amphibioidei.
        Superorder Crossopterygii.
        Superorder Dipneusti.
  Superclass Tetrapoda.
    Class Amphibia, etc.

Carl L. Hubbs
Field Museum of Natural History

[1] *Ann. Mag. Nat. Hist.* (8), 3, 1909, p. 76.
[2] Dollo, *Bull. Soc. Belg. Géol.*, 9, 1895, p. 79.

THE BUFFALO MEETING OF THE AMERICAN CHEMICAL SOCIETY

The Buffalo meeting of the society, known as the "Victory" meeting, was held April 7 to 11 and was attended by approximately 1,100 chemists, and was one of the most enthusiastic meetings the American Chemical Society has ever held. Professor Giacomo Ciamician was elected an honorary member of the society as Italy's leading organic chemist. Publication of compendia of chemical literature and monographs was undertaken by the society and committees appointed to carry the plan into effect. The society also joined with the National Research Council in approving the formation of an International Research Council and an International Chemical Council in which all neutral nations were to be allowed to participate on the same basis as the allies. The society again took a strong stand against the free importation of chemicals and chemical apparatus for educational institutions, believing that such a privilege not only retarded the production of such materials in this country, but it also created a false impression as to the superiority of foreign-made materials. The society voted that at the Philadelphia meeting which is to be held from September 2–6, inclusive, a Dye Section of the society should hold meetings with Charles L. Reese, as chairman. The opening meeting on Tuesday, April 8, was made especially interesting by the three following addresses, which have been published in full in the May issue of the *Journal of Industrial and Engineering Chemistry:*

Introductory remarks on *The future of American chemical industry:* WILLIAM H. NICHOLS, president, American Chemical Society.

American chemical industries and the tariff commission: WILLIAM S. CULBERTSON, U. S. Tariff Commission.

German methods and our present situation: JOSEPH H. CHOATE, JR., Chemical Foundation.

A paper by Irving Langmuir on "The arrangement of electrons in atoms and molecules" proved so interesting that, on request, it was given a second time to a large audience of several hundred, some of whom were unable to attend the first presentation.

The following symposium on "Mustard Gas" with Wilder D. Bancroft, as chairman, was also especially well attended, and although abstracts of the papers have not been furnished, the papers themselves, will be published in the society's journals.

The social affairs of the meeting and the excursions were well planned and were a credit to the energy and good fellowship of the Western New York Section. The ladies were given a round of entertainment at the local clubs, theater parties and teas, and were also prominent at the banquet. Over 800 members of the society sat down to the smoker on Tuesday evening and enjoyed the lavish refreshments and entertainment offered by the Smoker Committee. The extensive excursion program was also enjoyed on Thursday afternoon and Friday to the chemical industries of Buffalo and Niagara Falls.

MUSTARD GAS SYMPOSIUM

Wilder D. Bancroft, *Chairman*

General properties: W. D. BANCROFT.

Mustard gas at the front (lantern): B. C. GOSS.

Chlorhydrine synthesis: M. GOMBERG.

Sulfur chloride synthesis: J. B. CONANT.

Manufacture of mustard gas: WILLIAM MARSHALL.

Tests: A. B. LAMB.

Accelerated hydrolysis: R. E. WILSON.

Permeability of protoplasm: CLOWES, LILLIE and CHAMBERS.

Permeability of skin: CLOWES, MARSHALL and SMITH.

Protective ointments: R. E. WILSON.

Protective clothing: A. E. HILL.

Protective clothing: CLOWES, GORDON and GREENSFELDER.

Persistency: A. B. LAMB.

The action exerted by antagonistic electrolytes on the electrical resistance and permeability of emulsion membranes: G. H. A. CLOWES.

Some reactions of mustard gas: O. B. HELFRICH and E. EMMET REID.

DIVISION OF AGRICULTURE AND FOOD CHEMISTRY

W. D. Richardson, *Chairman*

T. J. Bryan, *Secretary*

Sampling tankage and the effect of moisture on the ammonia content: PAUL SMITH.

Light weight vs. heavy oats: P. F. TROWBRIDGE.

Soft corn—its composition and nitrogen distribution: GEORGE SPITZER, R. H. CARR and W. F. EPPLE. A study has been made of the composition of the dry matter of corn which has been prevented from maturing, because of injury by frosts. The investigation also included the distribution of the nitrogen found in both mature and soft corn. It has been found that the soft corn is high in amide nitrogen in proportion to its softness, and that the zein content is lower in about the same proportion as the amide is higher. A circular diagram is presented, showing the relative amounts of amide, zein, globulin and glutelins present in both the mature and soft corn. Less of the total proteins in mature corn was found to be zein than has been reported. A separation of the nonamines from the diamines was made by the Van Slyke method, but no great difference in the nitrogen distribution was noted between soft and mature corn. The true starch is usually thought to be higher in mature corn, but this did not prove to be the case, as the fat which seems to be made last is at the expense of the starch, whereas in soft corn the frost caught it before there was a chance for starch to be changed over to the fat, hence the fat content of soft corn was only about one half of that of the matured.

A modified valenta test for butter: CHARLES P. FOX.

Heat penetration in processing canned foods: W. D. BIGELOW, G. S. BOHART and ALLAN C. RICHARDSON.

A further study of the DeRoode method for determining potash: T. E. KEITT.

The loss of moisture from sugar samples under different methods of preservation: C. A. BROWNE and G. H. HARDIN. The loss of moisture from raw sugar samples in tin cans and glass jars, unsealed and with various methods of sealing, was determined. The daily loss from sugar in ordinary tin cans varied usually from 0.01 per cent. to 0.02 per

cent., about 40 per cent. of the loss being between cover and can and 60 per cent. through the seams of the can. The loss between cover and can could be prevented only by adhesive tape made impervious with melted wax or paraffine. The employment of corks in glass jars or bottles did not afford a tight seal. Dipping the corks in melted wax or paraffine did not prevent loss of moisture owing to the heated air in the corks producing blow holes. A second dipping usually made the corks tight. Fruit jars sealed with a rubber ring and glass cover did not make a tight container. Glass jars with ground glass stoppers prevented drying out only when sealed with melted wax or paraffine. The objection against glass containers is the breakage during shipment. The only effective metal container is a seamless swaged can with cover sealed with adhesive impervious tape; the difficulty of the method is that of making a seamless can of sufficient size.

Diets of various birds and mammals: W. D. Richardson.

The diets of various peoples in the light of the Vitamine doctrine: W. D. Richardson.

The indispensability of milk in the adult diet: W. D. Richardson.

Division of Pharmaceutical Chemistry

F. O. Taylor, *Chairman*

George D. Beal, *Secretary*

Cooperation in drug research: F. R. Eldred.

Simple physical and biological models with which to study the penetration and function of drugs: G. H. A. Clowes.

Western poisonous plant investigations: O. A. Beath.

The U. S. P. assay for mercurial ointment: L. F. Gabel.

Alkaloids: M. H. Webster. Alkaloids are the active principles of plants and decomposed animal matter. Research work on alkaloids is intimately connected with the development of synthetic pharmaceutical chemicals and laid the foundation stone upon which the whole structure of organic dyes has been built. Reference is made to the discovery of alkaloids resulting from the search for those principles which differentiate the physiological action of drugs. Practical problems in the isolation and purification are discussed, and an attempt is made to trace these difficulties to alkaloidal functions in plant metabolism. Yields obtained in manufacture are compared with U. S. P. processes and the status of alkaloidal drug assay is viewed alongside the ideals sought for in all analytical methods and results.

The preparation of vitamine-activated fuller's earth: Atherton Seidell and R. R. Williams.

Further studies of the properties of the vitamine of brewers' yeast: R. R. Williams and Atherton Seidell.

Chloretone: trichlor tertiary butyl alcohol: H. C. Hamilton.

Color standards for cottonseed oil: H. V. Arny. A discussion of the classification of commercial cottonseed oil samples by color and the unsatisfactory character of the methods hitherto employed. A résumé of the work previously done by the author and his pupils on standardized colored fluids and their use in colorimetry. A report on the use of these fluids in matching the color of cottonseed oil: the conclusions being that prime white, choice summer yellow and off summer oils can be matched by proper blends of normal or half-normal acidulated ferric chloride solution, half-normal acidulated cobalt chloride solution and water: the exact figures being given in the paper.

Division of Biological Chemistry

I. K. Phelps, Chairman

R. A. Gortner, Vice-chairman and Secretary

Capsaicin, the pungent principle of capsicum: E. K. Nelson. Oxidation of methyl capsaicin (formed by treating capsaicin with di-methyl sulphate), gives veratric acid. Hydrolysis of capsaicin gives vanillyl amine (4-hydroxy-3-methoxy-benzyl-amine) and a decylenic acid. Capsaicin is found to be a condensation product of 4-hydroxy-3-methoxy-benzyl-amine and a decylenic acid. The decylenic acid, when hydrogenated, does not produce normal capric acid but an isomer of capric acid.

The relation of the physical properties of organic compounds to their toxicity to insects: William Moore. The results of a series of experiments with a large number of different chemicals show that the toxicity to insects of the vapor of an organic compound is correlated with its volatility or boiling point. The reason for this relation is due to the fact that in general a saturated or nearly saturated atmosphere is required before the vapor can gain entrance to the insect. Such an atmosphere is obtained by the use of smaller quantities of chemicals with high boiling points or low volatility. The factor of penetration is sufficient to completely mask the true toxicity due to chemical structure.

Studies of the chemotherapeutic type upon insecticides and fungicides: C. L. ALSBERG.

The absence of fat-soluble: A "vitamine" in glandular fats: A. D. EMMETT and G. O. LUROS. Fat extracted from the pancreas, thymus and suprarenal glands with acetone and ether was incorporated in a diet that was complete for normal growth in rats, except for the absence of the "fat-soluble A" accessory. Comparing the effect of these rations with that obtained with control group where a normal diet and one lacking in fat-soluble A were fed, it was found that none of the three glandular fats contained this accessory or "vitamine." The use of the desiccated thymus in the therapy of rickets would therefore seem to bear no relation to the presence of the fat-soluble A, as has been claimed by some.

The nutritive value of peanut and soy bean flours as supplements to wheat flour: C. O. JOHNS, A. J. FINKS and MABEL S. PAUL. Bread containing 75 per cent. wheat and 25 per cent. of peanut or soy bean flours, together with a suitable salt mixture and butter fat, produced normal growth when fed to albino rats. These diets contained approximately 18 per cent. of protein. Normal growth was also obtained when the total protein content of the diet was only 11 per cent. Controls were made by using wheat bread as the only source of protein and the growth was one third to two thirds normal, this diet containing 11 per cent. of protein. The investigation is still in progress.

A volumetric method for the detection and estimation of neutralizers in dairy products: L. W. FERRIS. By the use of picric acid and a standard hydrochloric acid solution the inorganic salts are separated from the milk proteins and the ratio of the alkalinity of these salts to the inorganic phosphoric acid is determined. This ratio is fairly constant for normal dairy products and is increased by the presence of neutralizers, the increase being in proportion to the amount of neutralizer present. The ratio is determined on samples of normal and neutralized products and a formula given for calculating the amount of neutralizer in a given sample.

Carbon monoxide—a respiration product of kelp: SETH C. LANGDON. It was determined that the carbon monoxide in the floater of the Pacific Coast kelp, *Nereocystis luelkeana,* is a by-product of respiration and not an intermediate step in photosynthesis. This was accomplished by substituting gases of known composition for those normally present in the kelp and then by analysis noting any change in composition. Carbon monoxide was formed only when oxygen was present in the substituted gas. It was formed both in the light and in the dark. Carbon monoxide was not formed within plants which had been killed nor was it formed when macerated kelp is allowed to decompose or undergo autolysis. This formation of carbon monoxide within a living plant is unique.

The effect of X-rays on the length of life of Tribolium confusum: WHEELER P. DAVEY.

The occurrence of gossypol in different varieties of Cottonseed: C. L. ALSBERG, E. W. SCHWARTZE and E. T. WHERRY.

Criticism of the Eckert method of determining nitrogen by the Kjeldahl method in nitro derivatives: I. K. PHELPS.

A discussion of the accuracy of the determination of nitrogen in organic substances by the Kjeldahl method: I. K. PHELPS.

Do mold spores contain enzymes? (By title.) NICHOLAS KOPELOFF and LILLIAN KOPELOFF. The query "Do mold spores contain enzymes" has been answered in the affirmative by the experimental data herein presented. The spores of *Aspergillus niger* heated to 63° C. for 30 minutes and shaken with sterile sand, caused a decrease in polarization and in increase in reducing sugars in a 10 per cent. sterile solution in 3 hours, and continued the same changes throughout the 4-day incubation at 45° C. These results were corroborated when a 20 per cent. sugar solution was similarly inoculated. Spores heated to 100° C. caused no change (neither did an inoculation with sterile distilled water) proving that the activity mentioned above was enzymatic in nature. The enzyme present exhibited activities identical with invertase, consequently the spores of *Aspergillus niger* contain invertase. Among the practical applications of this phenomenon the deterioration of manufactured cane sugar and certain transformations in the soil are especially significant.

The influence of ammonium hydroxide on the oxidation of acetone and on the acetone yield from the oxidation of butyric acid (by title): EDGAR J. WILTZEMANN.

The biological test for determining the fertilizer needs of a particular soil or crop: R. P. HIBBARD and S. GUSHBERG.

The quantity and composition of ewes' milk: its relation to the growth of lambs (by title): RAY E. NEIDIG.

An experimental study upon the impregnation of cloth with pediculicocidal substances: W. MOORE

and A. D. Hirschfelder. Substances were tested by placing 1 gram on a piece of underwear cloth 6 × 8 cm. and wearing next to the skin. Small strips were cut off every 12 hours and placed in a glass vessel with lice and eggs. When 100 per cent. were killed in 24 hours the substance was regarded as active. Of 170 substances previously tested cresol was found to be the best, but killing properties lasted only 24 hours when worn. Mono-, di- and tribrom cresols were prepared. Dibrommeta cresol was active for 10 days and dichlor monobrom meta cresol for 13 days and the sodium salts of tribrominated crude cresol lasted 15 days. These outlasted any substances thus far used in practise.

ORGANIC DIVISION

Lauder W. Jones, *Chairman*

H. L. Fisher, *Secretary*

The use of sulfur chlorides and chlorine for the production of organic acid chlorides from organic acids: Roger Adams.

Synthesis of chlorine derivatives, III.: R. R. Renshaw and C. E. Greenlaw.

Trimethyl phosphine and certain of its derivatives: R. R. Renshaw and F. K. Bell.

Trimethyl arsine and its selenide: R. R. Renshaw and G. E. Holm.

Phenylimido phosgene and some reactions of formanilide: W. Lee Lewis and G. A. Perkins. Phenylimido phosgene was prepared in 95 per cent. yields from thiocarbanilide by chlorinating in carbon disulphide or carbon tetrachloride solution. Phenylimido phosgene itself may be used as a solvent for the thiocarbanilide on chlorinating. No difficulty was experienced with ring chlorination and Nef's method of adding water to the reaction mixture before purification was found unnecessary. With a view to obtaining phenylimido phosgene from formanilide, it was found that chlorination in the presence of sulphur chlorides led to the formation of 2–4 di-chlor formanilide. In the presence of thionyl chloride chlorination of formanilide yields phenylamido chloroform.

The ammono-carbonous and ammono-carbonic acids: E. C. Franklin.

The reaction between dimethyl sulfate and benzene: Oliver Kamm and S. D. Kirkpatrick.

Contribution to the study of the relationship between chemical constitution and physiological action: Oliver Kamm.

A study of some of the carbohydrates of the corn cob: R. R. Renshaw and W. J. Suer.

Synthesis and properties of certain dyes containing the furane cycle: R. R. Renshaw and Nellie M. Naylor.

The preparation of pure organic chemicals: H. T. Clark.

Acetylene: William Malisoff and Gustav Egloff.

Ethane: William Malisoff and Gustav Egloff.

The occurrence of melezitose in honey: C. S. Hudson and S. F. Sherwood.

The chemistry of electrical insulators: H. C. P. Weber.

The estimation of mercaptans: R. L. Kramer and E. Emmet Reid.

Alcoholysis as a factor in the determination of saponification values: A. M. Pardee and E. Emmet Reid.

1, 2-dicholoroether: E. A. Wildman and Harold Gray. In the preparation of 1, 2-dichloroether by direct chlorination of ether it has been found that the process may be readily carried out if two precautions are observed: (1) In order to prevent the material catching fire spontaneously the ether must be at first cooled with an ice and water bath and the chlorine passed in very slowly. (2) To facilitate the escape of the hydrogen chloride formed in the reaction it is practically essential to agitate the mixture violently. Otherwise it tends to accumulate and then suddenly escape with sufficient violence to blow the contents out of the flask.

Aromatic ethers: J. M. Johlin. This paper outlines new methods for making aromatic ethers which are symmetrical, and for certain non-symmetrical aromatic ethers which have not been made heretofore.

Charles L. Parsons,
Secretary

(To be concluded)

SCIENCE

A Weekly Journal devoted to the Advancement of Science, publishing the official notices and proceedings of the American Association for the Advancement of Science

Published every Friday by

THE SCIENCE PRESS

LANCASTER, PA. GARRISON, N. Y.

NEW YORK, N. Y.

Entered in the post-office at Lancaster, Pa., as second class matter