nephropathic animals to a solution of sodium bicarbonate is compared with the response of the normal animals, the following differences are observed. The introduction of the solution into a naturally nephropathic animal effects a more marked disturbance of the acid-base equilibrium of the blood, as is shown by a greater increase in the alkali reserve, than occurs in a normal animal. When such a change is induced in the blood of a normal animal there occurs a rapid depletion of the reserve alkali of the blood with a return of the blood to its normal acid-base equilibrium. When, however, a similar type of change has been induced in the blood of a naturally nephropathic animal, the animal appears unable to effect with the same rapidity and degree of completeness a reduction in the reserve alkali of the blood with the reestablishment of a normal acid-base equilibrium. The reduction in the alkali reserve in such an animal takes place more gradually, and at the end of a two-hour period of observation the alkali reserve remains at a higher point than was obtained for the normal reading.

The experiments indicate that the reserve alkali of the blood in certain naturally nephropathic animals may be maintained by the animal within the range of normality. Such an observation is, however, no index of the ability of such an animal to maintain a normal acid-base equilibrium of the blood when the stability of the mechanism which regulates this equilibrium is subjected to the strain of handling either an acid or an alkali. When a normal animal receives intravenously an acid or an alkaline solution there occurs a disturbance in the acid-base equilibrium of the blood which is temporary, and which is rapidly followed by a reestablishment of the animal's normal acid-base equilibrium. When a naturally nephropathic animal is subjected to a similar disturbance in the acid-base equilibrium of its blood, the lack of stability on the part of the mechanism which maintains this equilibrium is shown by the facts that the acid or alkaline solution induces a greater degree of variation from the animal's normal equilibrium and that the animal is unable to reestablish within the time limit allowed the normal animal a return of the blood to a normal acid-base equilibrium.

WM. DEB. MACNIDER

UNIVERSITY OF NORTH CAROLINA

THE AMERICAN CHEMICAL SOCIETY

DIVISION OF PHYSICAL AND INORGANIC CHEMISTRY

Wm. D. Harkins, *chairman*

H. N. Holmes, *secretary*

Preparation of zinc nitride: W. J. BENTLY and PAUL L. STERN. After the trial of several methods of making zinc nitride the following was found to be the best. Ammonia was passed over zinc dust for 30 minutes at 650° C. and the product cooled to at least 200° C. before exposure to the air. The ammonia was treated to remove oxygen and moisture. The zinc dust was washed with a solution of ammonia and ammonium chloride, alcohol and ether. It was then dried in vacuo. The chief difficulty was in excluding oxygen from the system. The highest yield was 36.8 per cent. nitride. Alloys of zinc-zinc nitride were prepared up to 3.9 per cent. nitride. It is thought a thorough investigation will disclose many valuable properties.

Hydrolysis of the calcium phosphates: H. V. TARTER.

On the hydrolysis of the silicates of sodium: ROBERT HERMAN BOGUE.[1] A series of seven silicates of sodium have been examined in which the ratio of Na_2O to SiO_2 in the molecule varied from 1:1 to 1:4. Solutions of each were made at five different molecular concentrations, and examined electrometrically for their hydroxyl-ion concentrations. From these values the degrees of hydrolytic dissociation have been calculated. Agreement with earlier investigations was not attained, and hypotheses are presented to account for this disparity. The values obtained for hydrolytic dissociation are much lower than have been previously reported. As the percentage of Na_2O in the molecule increases, the resulting product becomes less stable, and in dilute solutions ever increasingly hydrolyzed.

A revision of the atomic weight of antimony: H. H. WILLARD and R. K. MCALPINE. Final report on the analysis of the tribromide.

On the separation of crystalloids from one another by dialysis: LOUIS KAHLENBERG. Using pyridine

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[1] Industrial Fellow Mellon Institute of Industrial Research, Pittsburgh, Penna.

as the solvent and vulcanized rubber membranes as the septa, the members of the following pairs were separated from each other by dialysis: (1) cane sugar and sulphur; (2) silver nitrate and naphthalene; (3) silver nitrate and camphor; (4) silver nitrate and sulphur; (5) cane sugar and camphor; (6) cane sugar and naphthalene; (7) lithium chloride and sulphur; (8) lithium chloride and camphor; (9) lithium chloride and naphthalene. In the case of each pair, the last named substance passed through the membrane and the first named remained behind in the solution in the dialyser. The results are entirely in harmony with the author's views on osmosis as expressed in a previous paper, *Jour. Phys. Chem.*, 10, 141 (1906), and in fact the results obtained were predicted by the principles laid down in that paper. The work is being continued. Not only have crystalloids been separated from each other by dialysis, but colloids have also been thus separated from each other, and colloids have been separated from crystalloids *by having the colloids pass through the membrane* and crystalloids remain behind in the solution in the dialyser. These results too are in perfect accord with the principles of osmosis as expressed by the author in his previous publication (l. c.).

Investigations on gelatines. Decay of viscosity on hydrolysis as a function of hydrogen ion concentration: S. E. Sheppard, Felix A. Elliott, Harry D. Gideonse and (Miss) C. M. Godden.

Investigations on gelatines. Protein errors of indictors: (Miss) A. J. Benedict and Felix A. Elliott.

Gelatine as an emulsifying agent: Harry N. Holmes and W. C. Childs. Using gelatine as a typical hydrated colloid excellent emulsions of kerosene-in-water were made and their stability observed. It was found that the leading factor as regards stability was a definite and most favorable viscosity, no matter how obtained. This viscosity could be secured by using the required concentration of gelatine, or with more gelatine made less viscous by such peptizing salts as sodium iodide, or with less gelatine made more viscous by coagulating salts of the sodium sulfate type. Lowering of surface tension was a factor of somewhat less importance. There was no evidence within the limits of accuracy employed of the formation of adsorption films at the oil-water interface. There must have been such adsorption but it was evidently too limited in amount to play a leading part in emulsification.

Adsorption of precipitates III: The adsorption of precipitating ions by hydrous aluminum oxide: Harry B. Weiser and Edmund B. Middleton.

The thermal decomposition of gaseous nitrogen pentoxide. A mono-molecular reaction: Farrington Daniels and Elmer Johnston. (Lantern.)

The structure of gold amalgams: S. A. Braley and R. F. Schneider. (Lantern.)

Some new methods for determining the vapor pressure of hydrated salts: Robert E. Wilson. (Lantern.)

Measuring low vapor pressures: Alan W. C. Menzies.

Adsorption of gases by nickel catalyst and the mechanism of hydrogenation: H. S. Taylor and A. W. Gauger.

A new form of titration hydrogen electrode: Felix A. Elliott and S. F. Acree.

Electrometric standardizing of permanganate and dichromate with hydriodic acid, and the "super-oxidizing power" of dichromate: W. S. Hendrixson. Potassium iodide, free from other halogens and standardized with silver, was titrated electrometrically in normal sulfuric acid with permanganate standardized with sodium oxalate. Known solutions of potassium dichromate were treated with twice their equivalent of potassium iodide, and the excess of the latter titrated with permanganate. The dichromates were true to theory, showing no "super-oxidizing power," contrary to J. Wagner and others and in agreement with G. Bruhns and others. The use of hydriodic acid as a standard in oxidimetry, practical applications and interferences will be further studied.

The isotopes of lithium as related to the constitution of the nuclei of atoms: W. D. Harkins. (Lantern.)

The distribution of strong electrolyte between benzene and water: Arthur E. Hill.

The cryoscopy of boron trifluoride solutions: system with hydrogen sulfide: A. F. O. Germann and H. S. Booth.

The dielectric constant of selenium oxychloride: James E. Wildish.

Ion conductance of strong electrolytes: D. A. McInnes.

The independent origin of acrinium: Elliott Q. Adams.

Nephelometric estimation of sulfur and barium: Lloyd K. Riggs and C. Walter Eberlein.

Further studies on the freezing points of the nitrotoluenes: J. M. Bell, E. B. Cordon, F. H. Spry and W. White.

The system water-benzene-silver perchlorate: Arthur E. Hill.

The cryoscopy of boron trifluoride solutions: System with phosgene: A. F. O. Germann and Vernon Jersey. (Lantern.)

III. The cryoscopy of boron trifluoride solutions: Systems with sulfur dioxide and with nitric oxide: A. F. O. Germann and Wendell Phillips. (Lantern.)

The cryoscopy of boron trifluoride solutions: System with hydrogen chloride: A. F. O. Germann and Leland R. Smith. (Lantern.)

Conductance corrections and ionic mobilities from hydrated ion concentration measurements: Felix A. Elliott and S. F. Acree.

Contact potentials in hydrogen ion determinations: (Miss) A. D. Dushak, Felix A. Elliott and S. F. Acree.

Titration curves of some new buffer mixtures: (Miss) A. D. Dushak, Felix A. Elliott and S. F. Acree.

Investigations on gelatines. The Gold Number: S. E. Sheppard and Felix A. Elliott.

The hydrogenation of benzene: H. S. Taylor and G. Dougherty.

Period of induction preceding changes of hydration in the hydrates of cupric sulfate: Nathaniel H. Furman and Alan W. C. Menzies.

Certain physical properties of three oils: Alan W. C. Menzies.

The oxidation and luminescence of phosphorus I: The behavior of phosphorus in pure oxygen: Harry B. Weiser and Allen Garrison.

The photochemical decomposition of gaseous nitrogen pentoxide: Farrington Daniels and Elmer Johnston. (Lantern.)

An improved method for the preparation of cuprous chloride and cuprous bromide: Henry C. Waterman and Curtis M. Parkhurst. (By title.)

"Radiation as factor in chemical action": Irving Langmuir.

"The crystal structure of ice": D. M. Dennison and Irving Langmuir.

DIVISION OF CHEMISTRY OF MEDICINAL PRODUCTS

Charles E. Caspari, *chairman*

Edgar B. Carter, *secretary*

A new organic arsenical and related compounds: C. S. Leonard[1] and Edward Kremers. Preliminary experiments on the chemistry of the heptane solution having revealed the readiness with which the halides of the elements of the fifth and fourth groups react with organic bases, the piperidine derivatives of arsenic, antimony, silicon, and tin were prepared. The reaction with arsenic trichloride may be indicated in the following manner:

$$\mathrm{As\,Cl_3 + C_5\,H_{10}\,NH \rightarrow As\,(C_5H_{10}N)_3As \cdot 3HCl.}$$

A preliminary pharmacological investigation of the arsenic compound has been made by C. S. Leonard and Julia Whelan in the laboratory of Professor Loewenhart. Compounds with other bases, also with other halides, have been prepared in the test tube, but have not yet been obtained in sufficient quantity and of desired purity for analysis and further study. The continuation of this line of research is contemplated. In another direction, a secondary hexyl derivative of piperidine has been prepared to test out a recent theory concerning the length of the chain in local anaesthetics. The preparation of the corresponding heptyl product is under way.

Available chlorine for disinfectant bath: L. E. Sayre. Experiments with different formulæ solutions of hypochlorite, acting upon resistant microorganisms, to ascertain what kind of solution produces the maximum efficiency. Experiments performed to meet a demand of the Board of Health of Kansas.

On the rate of evaporation of ethyl chloride from oils: Charles Baskerville and Myron Hirsh.

Experiences with and new applications of oil-ether in anesthesia: Charles Baskerville.

Some recent anesthetics: E. H. Volwiler. Within the last year some local anesthetics have been produced to replace cocain for surface anesthesia. They are the gamma di-n-butylaminopropyl alcohol ester and the gamma diallylaminopropyl alcohol ester, respectively, of p-aminobenzoic acid. The latter is only two fifths as toxic as cocain and more than twice as effective on the rabbit's cornea. Two new local anesthetics of the anesthesin type are the n-butyl and the allyl esters of p-aminobenzoic acid. The former gives anesthesia of long duration, the latter very rapid anesthesia. This work has been done by the research staff of the Abbott Laboratories.

The origin and biological significance of the diastases: Hugh A. McGuigan. A general study of diastatic activity has been undertaken in the attempt to determine the origin and significance of the diastases. From this work and previous work,

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[1] Newport Chemical Company Fellow.

the following facts are obvious: All cell tissues contain diastase. The more vigorous and active the tissue the greater the diastase content. Diastase is formed in greater quantity, perhaps entirely, in the anabolic or growing state. This anabolic state persists to some extent as long as the tissue lives, and while not manifest by an increase in size, is manifest in the repair of tissues exhausted by the basal metabolism. In conditions of great waste, *i.e.*, excessive katabolism, there is a decrease in diastase content. The method used for the determination of the diastatic content of the tissues is described in the *Journal of Biological Chemistry*, 1919, Vol. 39, p. 274. The order of diastatic activity of the dog and rabbit was given. The tissues of other animals show a close agreement with this test. The effect of the state of health on the diastatic content of the blood of human patients suffering from cancer, pernicious anemia and typhoid was compared with the diastatic content of normal blood. In all cases the content was lower in the diseased state. This is in agreement with what has been found on plants which contain more diastase in the healthy vigorous state. The suggestion is made tentatively that the diastase content of a tissue may be used as a measure of its functional activity, and perhaps also as a test of basal metabolism. While the work is unfinished it would seem that diastatic activity runs parallel with functional activity; the more active the tissue the greater its diastatic activity and the significance of the diastases is that of life itself. There is no indication that diastase is a waste product as has been assumed by some investigators.

New benzyl esters possessing anti-spasmodic action: H. A. Shonle and P. Q. Row. In investigating the anti-spasmodic action of the benzyl nucleus the benzyl esters of lauric, myristic, palmitic, stearic, and oleic acids were prepared. They are either liquid or low melting solids, insoluble in water and practically tasteless and odorless. They are hydrolyzed as readily as olive oil when acted on by lipase in vitro. They possess no irritating effect on the mucous membrane, and in clinical cases cause the relaxation of smooth muscle.

Benzyl succinate: Mortimer Bye. Following in the footsteps of Macht, of Johns Hopkins, and appreciating the many objectionable features in the administration of benzyl benzoate, the writer was led to seek for some *solid* material which would be more suitable for medication and more palatable to take. Benzyl succinate seemed to offer a solution of this problem, and accordingly the product was prepared, following modifications of the method of Bischoff & Von Hedenstrom (*Ber.*, 35, 4079) in which succinic acid and benzyl alcohol in molecular proportions are heated on an oil or metal bath for several hours at 180°–190°; after cooling and filtering the filtrate is subjected to vacuum distillation on a metal bath. The benzyl succinate distilling over at 235°–245° C. at 15 mm. pressure, crystallizes on cooling and is purified with solutions such as alcohol, ether or chloroform. The product is a beautiful snow white crystal, practically with very little odor or taste and practically non-toxic. Judging from our own experience and by the work of other investigators, benzyl succinate should be applicable to the treatment of all "diseases" wherein the use of benzyl benzoate is indicated. Such uses will be given in greater detail in the main paper.

Benzyl derivatives of salicylic acid: E. A. Wildman. It has seemed desirable to investigate the various types of compounds containing the benzyl radical in other types of linkage than esters. The benzyl ether of salicylic acid has been shown to possess distinct physiological activity.

Some new compounds of phenylcinchoninic acid: H. W. Rhodehamel and E. H. Stuart. Phenylcinchoninic acid (2 phenyl-quinoline-4-carboxylic acid) combines readily with halogens and forms stable compounds with well characterized properties. A hydrochloride, hydroiodide, hydrobromide and hydrofluoride are described. Phenylcinchoninic acid also combines readily with quinine to form quinine phenylcinchoninate. This compound occurs as a white crystalline, nearly tasteless body, insoluble in water, but soluble in alcohol and acetone.

Charles L. Parsons,
Secretary

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