placed in the same cage and their deflections are recorded upon the same sheet, and the agreement is, if possible, better than before.

FERNANDO SANFORD

PALO ALTO, CALIFORNIA

## THE AMERICAN CHEMICAL SOCIETY

DIVISION OF BIOLOGICAL CHEMISTRY

W. T. Bovie, *chairman*

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*Studies of the vitamin potency of cod liver oils—X. Vitamin potency of medicinal cod liver oils:* ARTHUR D. HOLMES. In order to obtain information concerning the vitamin potency of present-day medicinal cod liver oils, a number of bottles of oil were purchased on the open market. The chemical and physical characteristics of these oils were determined by the usual analytical methods. A study of their vitamin potency showed that the vitamin content of medicinal cod liver oils may vary as much as tenfold. Also, it appears that there is little, if any, relationship between the chemical and physical characteristics of cod liver oils and their vitamin potency. These results show the need of information concerning the amount of the fat-soluble vitamins present in cod liver oil to be used in vitamin therapy.

*Studies of the vitamin potency of cod liver oils—XI. The vitamin potency of butter oils produced on summer feeds.* ARTHUR D. HOLMES. To obtain information concerning the vitamin potency of dairy butter, a supply of milk was obtained from several cows. These cows represented a number of well-known dairy breeds, but they were of different ages, and their pasture diet had been supplemented by different commercial grain rations. For the purpose of this study, the milk fat was separated in the form of butter oil. The vitamin potency of the different butter oils was determined under uniform laboratory conditions. The results of these tests indicate that summer butter produced under favorable conditions may have a vitamin potency equal to one hundredth that of first quality cod liver oils.

*Detoxication of aromatic cyanides:* C. P. SHERWIN and L. R. CERECEDO. Giacosa fed benzyl cyanide to dogs and found an increase in the ethereal sulfate excretion and also a positive reaction with Millon's reagent. He claims to have isolated phenaceturic acid from the urine. We fed benzyl cyanide to dogs and found neither phenaceturic nor hippuric, but free benzoic acid in the urine. After feeding p-chlorbenzyl cyanide to dogs, we noticed no symptoms indicating marked toxicity. We found only p-chlor-benzoic but neither p-chlor-phenaceturic or hippuric acid. We are studying the effects of this compound in the metabolism of the dog.

*A method for the estimation of hydrogen sulfide in food products:* L. H. ALMY. Hydrogen sulfide is driven out by a current of carbon dioxide bubbling through the aqueous acidified mixture of the food product. It is absorbed in dilute zinc acetate solution, the latter solution then being treated with p-amino-dimethylaniline hydrochloride, hydrochloric acid and ferric chloride solution for the production of the methylene blue color. The amount of sulfide sulfur present is determined by comparison of the color with that of standards prepared by treatment of solutions containing known amounts of sulfide sulfur with the aforementioned test reagents. Analyses of beef, pork and fish showed that hydrogen sulfide was formed progressively during the putrefaction of these products. The method is also applicable to the examination of mineral waters, sewage, bacterial cultures, etc.

*The isolation of a crystalline substance (M. P. 223° C.) from autolysed yeast with the properties of a bios:* WALTER H. EDDY, RALPH W. KERR and R. R. WILLIAMS. A crystalline substance with a melting point of 223° C. will be exhibited, which by crystallographic methods has been shown to be a single substance and which when added to Fulmer's Medium F. in quantity not exceeding .005 mgs per cc of culture medium increases the volume of yeast cells in a 24-hour incubation at 31° C. by approximately 15 to 20 times that of a control on the medium alone. The method of obtaining this crystalline bios through use of differential adsorbents and pH control will be outlined.

*A colorimetric method for the determination of furfural:* GUY E. YOUNGBURG and GEORGE W. PUCHER.

*The vitamin A content of fresh eggs:* JOSEPH C. MURPHY and D. BREESE JONES. Experiments indicate that rats which have been permitted to develop xerophthalmia on a Vitamin A free basal diet can be cured of xerophthalmia, and restored to normal weight by feeding 0.75 gm of fresh whole egg daily. Smaller amounts are sufficient for curing xerophthalmia than for restoring of growth. 0.25 gm fed daily, after onset of xerophthalmia, sufficed to cure the eye condition, without, however, permitting restoration to normal weight and growth. Based on analyses previously reported, 0.75 gm and 0.25 gm of whole egg are equivalent, respectively, to about 0.25 gm and .088 gm of yolk. On the basis of dried yolk, these figures would be 0.13 and 0.41 gm. Expressed in terms of the oil content of egg yolk, about 75 mgm of egg oil would be required for growth restoration, and 25 mgm for curing xerophthalmia.

*Determination of the protopectin in Irish potatoes:* C. M. CONRAD. In attempting to work out a reliable method for the determination of protopectin in potatoes, the concentration of acid, the pressure and the period of heating have been systematically varied and the resulting pectin determined by the calcium pectate method of Carre and Haynes. The results show that each of these factors has a very important effect. The highest yield of calcium pectate was obtained by boiling the material at atmospheric pressure for one hour in one thirtieth to one fiftieth normal hydrochloric acid. When the other conditions were optimum, a higher pressure did not increase the amount of pectin liberated.

*The equilibrium between creatine and creatinine in aqueous solution and the effects of hydrogen ion:* GRAHAM EDGAR and H. E. SHIVER. The equilibrium con-

stant for the conversion of creatine to creatinine in aqueous solution has been determined at 25°, 50°, 70° and 100° C. The heat of reaction is about 4,800 cal. The effect of increasing hydrogen ion concentration is to increase the ratio of creatinine to creatine because of the formation of a larger proportion of creatinine ion than of creatine ion. Measurements have been made of the equilibrium conditions in solutions of known pH, and the theoretical relations have been discussed.

*The buffer mechanism for the calcion concentration:* I. NEWTON KUGELMASS. The calcion concentration is regulated by calcion buffers. They are electrolytes which resist the change in calcion concentration upon addition of calcium salts. Calcion buffers are mixtures of weak acids, HA, and their salts, BA, which react to form normal calcium salts and soluble intermediate calcium salts. The calcion concentration of any calcion buffering solution is given by

$$Ca^{++} = K \div \frac{[HA]^n}{[BA]^{2n}}$$

where n is the ratio of the valence of calcium to that of the acid, and K is an equilibrium constant. Expressed in logarithmic units,

$$\log \frac{1}{[Ca^{++}]} = pK\,pCa$$

and

$$pCa = pK + n \log \frac{[BA]^2}{[HA]}$$

*The determination of calcion buffer values:* I. NEWTON KUGELMASS.

*The estimation of hydrogen ion concentration by colorimetric titration:* J. C. BLAKE. Neutral water, to which has been added the same concentration of neutral indicator as added to unknown, is titrated with dilute (0.01 normal?) acid or alkali until colors match to the eye. Final adjustment is made by further titration in colorimeter vessels, or by motion of plungers. By increasing volume of neutral water started with, any degree of accuracy can be obtained. Colored solutions (for example, urine) yield satisfactory results, provided the color of entire column of liquid is first matched against Lovibond glass slides, which are likewise used in the final titration. The slides also permit establishment of the neutral point for various indicators in terms of unchanging colors.

*A factor influencing reproduction and nursing of the young in the albino rat:* CHAS. H. HUNT. Rats reared on a synthetic diet of purified protein, fat, carbohydrates, salt mixture and vitamins A and B grew at normal rate but were sterile. With this diet and 10 cc milk they were sterile. With this diet minus the salt mixture and 10 cc milk, they were fertile and reared young. With $CaCl_2$ and $Na_2HPO_4$ added (separately) to the milk, they reared four generations. If the $CaCl_2$ and $Na_2HPO_4$ were mixed and added to the diet, instead of to the milk, the rats were fertile, but not very successful in rearing young.

*Notes concerning the effects of radiation on solutions of albumen:* W. T. BOVIE and O. C. WOOLPERT. One volume of egg white was diluted with nine volumes of either distilled water or physiological salt solution and exposed to the radiations of a powerful mercury vapor arc. Before radiation the solutions were adjusted to various hydrogen ion concentrations by the addition of dilute acetic acid or sodium hydroxide and the effect of the hydrogen ion concentration on the heat coagulability of the radiated solutions determined. The hydrogen ion zone of heat coagulation is greatly constricted by radiation. The constriction proceeds, it seems, only from the alkaline side. These results are not in agreement with results previously reported by other investigators.

*On the mechanism of the light action on solutions of albumen:* W. T. BOVIE and O. C. WOOLPERT. Egg white solutions made up as above with hydrogen ion concentration adjusted for optimum heat coagulation were exposed to a powerful mercury vapor arc at 15°. Coagulum appeared immediately and increased during an exposure of fifteen hours when all the albumen was precipitated. Ten cc portions of a solution of albumen that had been radiated for two hours were removed and heated for half hour periods at temperatures ranging from 25° to 75° C. Each increment of temperature resulted in an increment in the amount of coagulum. Therefore, a radiated albumen solution contains not only molecules which will coagulate at 15° but other molecules which require higher temperatures to produce coagulation.

*A micro method for total nitrogen:* A. R. ROSE.

*The inhibition of coagulation in albumen solutions produced by radiation:* W. T. BOVIE and O. C. WOOLPERT. Solutions of egg albumen with the hydrogen ion concentration adjusted to the alkaline side of the iso-electric point ($5 \times 10^{-7}$) at which they may be completely coagulated by heat if radiated for a sufficient period of time do not coagulate upon heating to 100° C. The inhibitory effect of the light was also shown by alcohol experiments. The increased stability of the radiated solutions can be more strikingly demonstrated by mixing a small amount of the radiated solution with a large amount of non-radiated solution, when it will be found that the mixture will not coagulate even though heated to 100°.

*Reactions of cysteine, cystine and glutathione:* M. X. SULLIVAN. When 5 cc of solutions of various amino acids and thio compounds are treated with 1 cc of a 0.5 per cent. solution of 1.2 naphthoquinone-4-sodium sulphonate and then with 5 cc of a 20 per cent. solution of sodium sulphite in N/4 NaOH, the cysteine (used as hydrochloride) alone gives a red color. Glutathione, both in the oxidized and reduced form, failed to give the reaction. Cystine gave the reaction slowly, due to the reduction to cysteine by the sulphite. When the solutions of amino acids and of various thio compounds are treated with the naphthoquinone and then with one tenth volume of normal NaOH there speedily develops a color varying from reddish orange to dark brown, dependent on the concentration of the amino acids. Of the colors thus formed that given by cysteine is the only one not reduced to yellowish by sodium hydrosulphite $Na_2S_2O_4$.