

The president, Professor J. E. Howitt, in his address dealt with what should be the aims of this society. These, briefly summarized, are as follows:

First. To provide adequate facilities for the training of research men in plant pathology in Canada.

Second. To make provision for the publication in Canada of the results of scientific investigations in plant pathology not of interest to the general public.

Third. To make available to the general public the practical application of results obtained from scientific research in plant pathology.

Fourth. The unification of recommendations made by the various pathologists regarding the control of the more common diseases.

Fifth. The carrying out of a plant disease survey to secure information concerning the financial losses caused by disease to agriculture and forestry and the distribution of plant diseases throughout Canada.

Sixth. The adoption of a standard of qualifications required of men entering the field of plant pathology in Canada.

Seventh. The appointment of an advisory board to confer with the federal and provincial authorities regarding plant quarantine and other restrictive legislation.

Eighth. The maintaining of a bibliography of Canadian plant pathology.

Dr. E. C. Stakman, of the University of Minnesota, was a guest of the Canadian Branch and dealt with the cereal rust problems in the United States and Canada.

The papers on the following program were given at this meeting:

President's address, J. E. Howitt.

"Health and disease in plants," F. L. Drayton.

"Decay in timber of pulp and paper mill roofs." (Illustrated with lantern slides.) R. J. Blair.

"Butt rots of the balsam fir in Quebec Province," W. H. Rankin.

"Leaf blight of the white pine," J. H. Faull.

"Pseudorhiza of certain saprophytic and parasitic agaricinae" (illustrated), A. H. R. Buller.

Address of Welcome, President G. C. Creelman.

Address, Dr. E. C. Stakman.

"Education of plant pathologists." Discussion led by Dr. J. H. Faull.

"Witches broom of the Canada Balsam and the alternate hosts of the causal organism," R. E. Stone.

"Some comparative observations upon the shape

of *Basidia* and method of spore discharge in the Uredineæ and Hymenomycetes," A. H. R. Buller. (Illustrated with models and lantern slides.)

"Smut of western rye grass," W. P. Fraser.

Address, E. C. Stakman.

"Some observations made in inspecting for leaf roll and mosaic of potatoes," J. E. Howitt.

"New or little-known diseases of potatoes which cause the running out of seed," P. A. Murphy.

"Breeding beans for disease resistance," G. P. McRoster.

"Combination sprays for apple and potato," G. E. Sanders. (By title.)

"Some data on peach yellows and little peach," L. Cæsar.

"Fungi new to Ontario," A. W. McCallum.

"Some fungi and plant diseases comparatively new to Ontario," R. E. Stone and J. E. Howitt.

The following officers were elected for 1920:

President—Dr. A. H. R. Buller.

Vice-president—Dr. J. H. Faull.

Secretary-Treasurer—Dr. R. E. Stone.

Additional Members of the Council—Professor J. E. Howitt and Mr. F. L. Drayton.

THE AMERICAN CHEMICAL SOCIETY. VI

Colloidal reactions fundamental to growth: D. T. MACDOUGAL. (By title.) Living cell masses from the growing parts of plants in which the H-ion of the sap varies from PH, 3.9 to 7 may show an unsatisfied hydration (absorption) capacity which causes a swelling of 6 to 80 per cent. in thickness in distilled water at 18 to 20 C. Dried (dead) sections of the same material in which the salts originally dissolved in the sap have been adsorbed by solids at high concentrations during the progress of desiccation, show (total absorption) hydration capacities which causes enlargements as high as 550 per cent. of the volume of the dried material. The aspect of comparative swellings in acid and basic solutions (tested between 0.5 M and 0.000001 M) in the two cases are different, probably due to changes in the colloids caused by the adsorption of salts, etc. The actual volume reached by such material in swelling includes some osmotic action and is limited by the morphological or mechanical features of the tissues. Artificial mixtures of pentosans, agar, mucilage and gum, and of plant albumins made up to simulate so far as possible the composition of the plasmatic (living) colloids, show comparative hydrations or total swelling similar to cell masses, and of an equiva-

lent or greater amplitude. Specially prepared and purified agar and albumins prepared by E. R. Squibb & Sons are used in these experiments. Some of the results obtained are not explainable on the basis of the simple action of the H or OH ions, especially in the use of alkaline hydroxides, ammonia and amino-compounds. The reactions noted are fundamental or contributory to growth.

The antiscorbutic value of the banana: H. B. LEWIS. (By title.)

A study of various culture media, especially with reference to increasing their buffer effects and adjusting their P_H values: M. R. MEACHAM, J. J. HOPFIELD AND S. F. ACREE. (By title.) Titration or buffer curves of corn meal extract, malt extract and bean extract, culture media and chestnut bark extract, are shown. The desirability of adding acids, bases and salts to these extracts to make them more useful as culture media by increasing their buffer effect is pointed out. The further object of rendering, at the same time, the titration curves as near straight lines as possible is sought. Data and curves are given showing the practical attainment of these objects for two of the media. The preparation of the media is carefully described, so as to make possible their reproduction to within 0.25 to 0.50 of a P_H unit.

The cause of and remedy for certain inaccuracies in Hausmann's nitrogen distribution method: S. L. JODIDI AND S. C. MOULTON. (By title.) The proportion of acid amide nitrogen obtained by Hausmann's method, as modified by Osborne and Harris, is constant and does not depend upon the quantity of magnesium oxide applied to the distillation. The percentage of nitrogen contained in the magnesium oxide precipitate is the higher, the greater was the quantity of magnesium oxide employed in distillation, and vice versa. Conversely, the proportion of monoamino and diamino nitrogen is the smaller, the larger the amount of magnesium oxide used in distillation. In order to obtain uniform results and a minimum of "humin" nitrogen it is necessary to use the least possible amount of magnesia which is sufficient to render the substance to be distilled alkaline. In the case of plant and animal materials the uniform application of one gram of magnesium oxide seems to be satisfactory, while in the case of proteins one half of one gram suffices.

The antiscorbutic properties of raw lean beef: R. ADAMS DUTCHER, EDITH M. PIERSON AND ALICE BIESTER. Guinea pigs weighing 250 to 300 grams

were divided into experimental groups containing four pigs to the group. Cold water extracts of raw beef (representing 5, 10, 15 and 20 grams of beef) were fed daily to the individuals in each respective experimental unit. Other pigs received oats impregnated with chopped raw beef, the consumption of beef averaging 3 to 5 grams daily. In all cases scurvy developed in the same length of time as when the meat and meat extract were omitted from the diet, indicating that raw beef does not possess antiscorbutic properties so far as these properties can be ascertained by the method described.

Preliminary observations on the influence of the diet of the cow on the antiscorbutic and growth promoting properties of milk: R. ADAMS DUTCHER, EDITH M. PIERSON AND ALICE BIESTER. Guinea pigs receiving a daily diet of oats (ad lib.), water, and 25 c.c. of autoclaved milk (from stall-fed cows) developed scurvy in 15 to 18 days and died in 25 to 30 days with great loss in body weight. When 20 c.c. of autoclaved milk (from cows fed on grain and green grass) were substituted for the "stall fed" milk, scurvy developed 10 to 15 days later and death did not ensue for 40 to 60 days and no great loss in body weight occurred. Raw, pasteurized and separated milk (from cows on green grass) has been fed, and the results indicate that the nutritive value of these milks is higher than milk from other sources.

Rhubarb as an antiscorbutic: EDITH M. PIERSON AND R. ADAMS DUTCHER. Guinea pigs which have developed scurvy may be relieved and cured by introducing into the diet solid rhubarb, raw rhubarb juice, or rhubarb juice which has been boiled for fifteen minutes.

The function of vitamin in the metabolism of Sclerotinia cinerea: J. J. WILLAMAN. (By title.) The brown-rot fungus will not grow normally on purely synthetic media. When these media are supplemented by additions of vitamin, normal growth occurs. The vitamin has been prepared by adsorption on fuller's earth from a large variety of materials, including peach and plum juices, young tomato leaves, sprouts of beans, wheat and potato, the leaf buds of beans, fungus mycelia and sporophores, yeast, corn pollen, milk and pancreatin. Every material examined yielded the vitamin. Those materials which are characterized by high respiratory activity, either actual or potential, such as yeast, pollen, fungus spores, gave the most active vitamin preparations, both for vegetative growth and for reproduction. It is be-

lieved from these results that the vitamin in question will be found universally distributed in plant and animal tissues, and that it plays an essential part in the respiratory process. The evidence favors the view that this vitamin is the water-soluble antineuritic B.

The preparation of a stable vitamine product and its value in nutrition: H. E. DUBIN. An active stable vitamine product has been prepared from corn, autolyzed yeast, and orange juice. This vitamine product, containing the antineuritic, antiscorbutic and antirachitic vitamins, has been given the name "Vitaphos." A tentative analysis shows 10 per cent. calcium oxide, 15 per cent. phosphorus (mostly organic), 3 per cent. nitrogen, and 2 per cent. fat. Experiments with pigeons, guinea pigs and finally with children receiving "Vitaphos" in the diet, gave results showing that the product possessed marked growth promoting properties and both preventive and curative properties as regards polyneuritis and scurvy. Cases of rickets treated with "Vitaphos" showed marked improvements and considerable gain in weight. Further experimentation is under way.

Chemical isolation of vitamins: C. N. MYERS AND CARL VOEGTLIN. Brief historical discussion of previous chemical work with special reference to the pioneer researches of Casimir Funk. Vitamins are classified as antineuritic, antirachitic and antiscorbutic. Autolyzed yeast filtrate was used in part of the experiments but was found unsatisfactory on account of its complexity. Mastic emulsion, Lloyd's reagent, and ferric chloride were used in removing the active material from the filtrate. These purified fractions were tested for activity on polyneuritic birds. Dried yeast was finally used as the source of active material. Purification by means of heavy metal precipitation was carried out yielding a crystalline substance.

The vitamine content of wheat flour: C. O. JOHNS, A. J. FINKS AND M. S. PAUL.

The relation of plant carotinoids to growth, fecundity and reproduction in fowls: LEROY S. PALMER AND HARRY L. KEMPSTER. White Leghorn chicks were raised from hatching to maturity on rations containing the merest traces, if not entirely devoid, of carotinoids. The full grown hens exhibited normal fecundity although the yolks of the eggs were devoid of carotinoids. The carotinoid-free eggs showed normal fertility. A second generation of chicks, free from carotinoids at hatching have been hatched from the carotinoid-

free eggs. Carotinoid-free egg yolks contain a residual yellow pigment readily extracted by acetone, which is not related to the normal axanthophyll of the yolk. This paper appeared in full in the September issue of the *Journal of Biological Chemistry*.

The physiological relation between fecundity and the natural yellow pigmentation of certain breeds of fowls: LEROY S. PALMER AND HARRY L. KEMPSTER. (By title.) The fading of the yellow color from the ear lobes, beak, shanks, etc., of a hen during fecundity is due to the fact that fecundity deflects the normal path of excretion of xanthophyll from these parts of the skin to the egg yolk, with the resulting gradual disappearance of pigment from the epidermis because of natural physiological changes in the structure of the skin. It is impossible to restore xanthophyll to the epidermis or to color the adipose tissue of hens as long as fecundity exists. The loss of pigment from the ear lobes, beak, shanks, etc., as the result of egg laying, is an index of *continuous fecundity* only, not of *heavy egg laying*. This paper appeared in full in the September issue of the *Journal of Biological Chemistry*.

The influence of specific feeds and certain pigments on the color of the egg yolk and body fat of fowls: LEROY S. PALMER AND HARRY L. KEMPSTER. (By title.) Carotin and annatto are without influence on the color of the visible skin parts and adipose tissue of poultry. Sudan III. colors only the adipose tissue of non-laying hens and is without effect on the visible skin parts. With laying hens the egg yolk is colored in addition to the adipose tissue. Xanthophyll readily colors both the adipose tissue and visible skin parts of fowls of the type of the White Leghorn breed, as long as fecundity does not exist. Yellow corn and green feed are rich in xanthophyll. Hemp seed, barley, gluten feed and red corn contain traces of xanthophyll, while wheat, wheat bran, oats, cottonseed meal, meat scrap and blood meal contain negligible quantities of the pigment. This paper appeared in full in the September issue of the *Journal of Biological Chemistry*.

The relation of the natural enzymes of butter to the production of "tallowiness" through the agency of copper salts: LEROY S. PALMER AND W. B. COMBS. (By title.) "Tallowy" butter was produced by the addition of 0.017 per cent. copper lactate to both raw cream and cream which had been pasteurized at 79°-80° C. In each of several experiments typical tallowiness and bleaching oc-

curred in the raw cream butter several weeks before it appeared in the butter from the pasteurized cream. The oxidizing enzymes in raw-cream butter apparently accelerate the catalytic activity of the metallic salts which cause the production of typical "tallowy" butter. It was found that over-neutralization of the cream failed to accelerate materially the production of tallowiness by copper lactate. This paper will appear shortly in the *Journal of Dairy Science*.

The nutritive value of commercial corn gluten: C. O. JOHNS, A. J. FINKS AND M. S. PAUL.

The effect of calcium on the composition of the eggs and carcass of the laying hen: G. DAVIS BUCKNER AND J. H. MARTIN. Authors have shown that limiting the calcium supply of laying hens to that naturally occurring in the foods fed, causes a progressive thinning of the shell yet it does not materially change the percentage composition of the egg shells or their contents. The continued laying of eggs under this condition causes a gradual depletion of calcium in the carcass of the hen. It would seem from the figures obtained that as long as the economy of the hens permitted a formation of an egg shell that the contents of the shell would remain constant, thereby permitting an average supply of calcium for the proper development of the embryo of the chick.

Protein requirement in the maintenance metabolism of man: H. C. SHERMAN. (By title.)

The development of Tribolium confusum Duval in certain foods: ROYAL N. CHAPMAN. This study has shown that the confused flour beetle, *Tribolium confusum*, grows at about the same rate in the different grades of wheat flour and in some of the so-called wheat flour substitutes, but in certain of the low grade wheat flours and in some of the "substitutes" metamorphosis is retarded. The rate of development in first middlings wheat flour was adopted as the control. The instars were plotted on the ordinate and the time in days on the abscissa in such a way that the curve of development would be a straight line bisecting the angle. When the curves of development in other foods were superimposed upon the controls they were found to be very similar except for a prolongation of the last larval instar. Since metamorphosis takes place during the last instar, this prolongation has been taken as a measure of the nutritive effect upon metamorphosis. Certain low grade wheat flours, rye flour and rice flour prolonged the last instar while corn flour, steel cut oats and a synthetic food prolonged all instars about equally.

The influence of quinine on uric acid excretion in man: H. B. LEWIS AND W. L. MCCLURE. (By title.)

The uric acid content of normal human saliva: H. B. LEWIS AND W. S. GRIFFITH. (By title.)

Further studies on the chemical composition of normal and ataxic pigeon brains: MATHILDE L. KOCH AND OSCAR RIDDLE. A second series of analyses made on brains of pigeons affected with hereditary lack of control of the voluntary movements shows deviations from the normal brain in size and chemical composition. The brains are smaller. Eight analyses made on cerebrums and cerebellums show more pronounced changes in the cerebellums. Data for the chemical changes in the brain which accompany age have been obtained for a series of ages in the pigeon. The new and earlier evidence warrants the conclusion that chemical differentiation does not proceed as rapidly in the brain of ataxic birds as in the brains of normal birds.

A comparison of the distribution of various chemical groups in parts of the human and pigeon brain: OSCAR RIDDLE AND MATHILDE L. KOCH. Separate analyses made of anterior and posterior parts of the normal pigeon brain make it possible to compare these with similar parts of the human brain. It is found that the direction of the percentage differences in composition of the two parts of the brain is the reverse of that of the human in the case of every chemical fraction obtained. Also, from a chemical standpoint the cerebellum of the pigeon is an intermediate of the pigeon cerebrum and the human brain (cerebrum and cerebellum). The pigeon cerebrum is chemically least differentiated, the human cerebrum most differentiated, of the four organs compared.

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Secretary

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