Exposure was to full radiation from a Cooper Hewitt quartz mercury arc, half of the colony shaded with cardboard to serve as a control. Two kinds of radiation resulted in perithecia: a, direct rays upon the exposed half of the colony, which resulted in perithecia deeply buried in the agar; b, indirect rays diffused to a few millimeters under the edge of the cardboard shield, which gave superficial perithecia.

The activating region of the spectrum has been determined by means of various screens as in the far ultra-violet, probably between the Ångstrom wave-lengths of 2760 and 3130.

That the effect is not the result of a chemical change produced in the medium by the radiation, but is a direct response by the mycelial cells to radiation, is rendered extremely probable by the results of several experiments directed to this special question.

Studies are now being made to determine the exact wave-lengths involved and the effect of these rays upon other species and genera of fungi both of the Ascomycetes and Fungi Imperfecti; the relation of the age of the mycelium to its susceptibility to stimulation; and the various steps in the development of the perithecium from the time of stimulation onward.

A presentation of this study was made at the meeting of the Illinois Academy of Science in April and a more complete account will be published soon in the *Botanical Gazette*.

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THE AMIDE NITROGEN OF BLOOD

WHEN it was established by Folin and Denis[1] that blood contains exceedingly small quantities of ammonia, it became necessary to consider whether or not such amounts were capable of furnishing the ammonia found in urine by simple excretion by the kidney.

Nash and Benedict[2] reasoned that the kidney must form the ammonia it excretes because they found no increases in blood ammonia with kidney ablation, and increases in urinary ammonia seemed to be unaccompanied by significant increases in the ammonia content of blood. Their belief in the special ammonia-forming function of the kidney was strengthened by their observation that the blood leaving the kidney is richer in ammonia than the blood that enters it.

The subsequent finding of Bliss[3] that other organs, notably the pancreas, show increases of ammonia in the blood leaving the organ suggested that ammonia formation, instead of being limited to the kidney, is a general tissue phenomenon.

He was not only able to demonstrate accumulations of ammonia in the blood of nephrectomized dogs, but found that such dogs only maintain low levels of blood ammonia concurrently with the elimination, by way of vomitus, of amounts of ammonia quantitatively comparable to their normal urinary excretion of ammonia.

While unsuccessful attempts have been made to demonstrate the existence of complex ammonia combinations in blood, this phase of the subject has now been studied with very favorable results. The demonstration of ammonia in a form not yielded by the ordinary methods, yet available within the body under the influence of enzyme action, would clear up a large body of facts already known about ammonia metabolism.

It seemed that the kidney might possess an enzyme that is capable of liberating ammonia from its combination in blood, and the search for such an enzyme revealed its presence.

The determination of ammonia that is obtained from blood by the use of this new kidney enzyme furnishes amounts of ammonia approximately a thousand times the old value—and for human blood the value is 115–125 mg instead of 0.05 to 0.10 mg nitrogen per 100 cc blood.

When purified casein was tried as a possible substrate for the enzyme, ammonia was liberated in appreciable amounts.

Using casein as a substrate, the new enzyme was compared with trypsin as to the rate of formation of amino-nitrogen and ammonia. Hunter and Smith[4] found that 37 per cent. of the casein nitrogen was in the form of amino-nitrogen after twenty-four hours' contact with trypsin, while the kidney enzyme liberated somewhat less than that amount in three days. A comparison of the formation of ammonia from casein by both enzymes shows that the kidney enzyme is much more specific for ammonia formation. Trypsin yielded 0.8 per cent. of the total casein nitrogen as ammonia in twenty-four hours, and 4.26 per cent. in eighty-eight days, while the kidney enzyme liberated more (5.1 per cent.) in four days than had trypsin in eighty-eight days (4.26 per cent.).

Hunter and Smith say:

> The absence of relation, in our experiments, between peptolysis and amidolysis is so conspicuous that these processes would really seem to have been catalyzed by two separate enzymes. We venture accordingly to suggest, as a working hypothesis, that the liberation of the

[1] Folin, O., and Denis, W., *J. Biol. Chem.*, xi, 161 (1912).

[2] Nash, T. P., Jr., and Benedict, S. R., *J. Biol. Chem.*, 1921, xlviii, 463.

[3] Bliss, Sidney, *J. Biol. Chem.*, 1926, lxvii, 109.

[4] Hunter, Andrew, and Smith, Ralph G., *J. Biol. Chem.*, 1924, lxii, 649.

amide-nitrogen of proteins is not, strictly understood, a function of trypsin at all, but is to be attributed to the action of a specific enzyme, possibly of tissue origin, by which trypsin as usually prepared is liable to be accompanied.

The discovery of the enzyme in kidney seems to justify the opinion quoted from Hunter and Smith—and this enzyme has been shown to be directly concerned with ammonia metabolism.

The action of the kidney enzyme suggested so strongly that it was amide-nitrogen that was being attacked that the more simple, direct and accurate method of acid hydrolysis was tried. This was particularly indicated by the fact that no ammonia was ever liberated by the new enzyme from the protein-free fraction of blood, so that it was possible to use the blood proteins only for the ammonia determination.

Acid hydrolysis was found to give results of the same magnitude as those obtained by the use of the new enzyme. The method that was developed is now in the course of publication elsewhere.

The amide-nitrogen of blood is to be carefully distinguished from the conception of an ammonia-precursor or ammonia "mother-substance." From the metabolic standpoint it has been shown by studying the changes in amide-nitrogen during changing conditions of acid-base balance in the body that the amide-nitrogen of blood comes from ammonia formed in the tissues.

Parnas[5] has measured the ammonia that develops when blood is allowed to stand, and his values, which are only 2 to 4 per cent. of the values hereby established, he has designated as representing an ammonia-precursor or "ammonia mother-substance." The work of Parnas has, therefore, no relation to the presence of amide-nitrogen. After considerable study by himself and collaborators, Parnas concludes that his "ammonia mother-substance" bears no relationship to the state of acid-base balance: "Es wird daraus geschlossen, dass die Ammoniakmuttersubstantz des Blutes eine andere physiologische Funktion hat als *Ammoniak* als solches zu bilden, und dass aus den abgespaltenen Aminogruppen in vivo andere Stickstoffverbindungen entstehen."

In the latest articles that have come to the attention of the writer, the "ammonia mother-substance" of Parnas has been abandoned and the attempt made to attach metabolic significance to the exceedingly low values for ammonia which must now be considered as accidental values developed during the course of the analysis.

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[5] Parnas, J. K., and Heller, J., *Biochem. Ztschr.*, 1924, clii, 1.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE SPRING MEETING OF THE EXECUTIVE COMMITTEE

THE regular spring meeting of the executive committee of the council of the American Association was held at the Cosmos Club, in Washington, on Sunday, April 22, with the following members present: Cattell, Curtiss, Humphreys, Johnston, Kellogg, Livingston, Wilson. The absent members were: Moulton, Osborn, Pupin, Ward. The chairman, Dr. J. McKeen Cattell, presided. The following is a summary of the business transacted.

1. The minutes of the last meeting were reported as having been approved by mail.

2. The permanent secretary reported that, since last September 30, there had been a net increase in membership of 1,453. The number of members in good standing on April 21st was 15,074, with 1,241 additional names on the roll, but in arrearage for dues for one or two years. The total number of names on the roll was therefore 16,315. The number of those in arrears was proportionately somewhat less than for the same date last year. About next October 1 there will be sent out between 75,000 and 80,000 invitations asking non-members to join the association. Members are asked to continue to send to the Washington office names of persons who might be interested to join.

3. A letter was read from William L. Corbin, librarian of the Smithsonian Institution, who said, in part: "I am writing to thank you and, through you, the American Association for the Advancement of Science, for the very generous gift of miscellaneous publications that the association made not long ago to the Library of the Smithsonian Institution. We are deeply appreciative of this gift and most grateful for it. Already, in checking up these publications, we have discovered hundreds of complete volumes and parts of volumes needed in our standard sets. Not a few of these we had found it impossible before to get from any source. Other volumes and parts of great value to us are coming to light every day as the work of sorting the contents of the boxes goes on."

4. It was voted that the regular fall meeting of the executive committee will be held at the Cosmos Club, in Washington, on Sunday, October 21, 1928, the morning session to open at 11 o'clock.

5. A committee of three was named, to cooperate with the section committee of Section K (Social and Economic Sciences), to elect a section secretary and to arrange for the section at the approaching New York meeting. This committee consists of J. McK. Cattell, B. E. Livingston and Edwin B. Wilson, the last mentioned being chairman.

6. Dr. Wesley C. Mitchell, director of research,