

them. So that for the purpose at hand, albumen may be classed among the amino acids. There were then altogether 3 instances in which the 4 "non-amino acid" substances were better than amino acids. On the other hand most of the latter were better than most of the former. This was well illustrated. Alanine, glycocoll, leucine, tyrosine > NH<sub>4</sub> acetate, (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub>, (NH<sub>4</sub>)<sub>3</sub> citrate, NH<sub>4</sub> lactate, NH<sub>4</sub>NO<sub>3</sub>, (NH<sub>4</sub>)<sub>2</sub> oxalate, (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>, (NH<sub>4</sub>)<sub>2</sub> tartrate, caffeine and urea; glycocoll, alanine, leucine, aspartic acid > NH<sub>4</sub> acetate, betaine and urea; histidine, tryptophane, leucine and glycocoll > NH<sub>4</sub> lactate and urea. The contrast is clear. In general, amino acids supply the streptococcus with N needs better than do other N compounds.

In this study, too, as was the case with carbon compounds,<sup>5</sup> there were instances of N addition causing no effect on the growth of the organism. This was true of (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub>, (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>, urea, aspartic acid, glutamic acid, tyrosine, uric acid and NH<sub>4</sub> lactate.

Tests on a series of 70 media containing N in imidazo, pyrole, pyridine, quinoline, azo, nitro-benzene and alkaloid linkages showed that streptococci can utilize the N from anthranilic acid, indigo and neosalvarsan.

#### 4001

### Studies on Anaphylaxis with the Products of Peptic Digestion of Proteins. II.

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In the experiments reported previously<sup>1</sup> material was used for the peptic digestion consisting mainly of egg albumin but also containing egg globulin. Since it was thought that possibly the latter was responsible for the effects observed, experiments were made with preparations of egg globulin. The results were in agreement with the former experiments in that the animals sensitized with the peptic digestion products were more sensitive to these than to unchanged globulin and vice versa. This result was especially pronounced in one batch of guinea pigs, the lethal intravenous dose for the animals sensitized with the digestion product being 1 cc.

<sup>5</sup> Krasnow, F., and Rosenberg, M. L., *PROC. SOC. EXP. BIOL. AND MED.*, 1928, xxv, 295.

<sup>1</sup> Landsteiner, K., *PROC. SOC. EXP. BIOL. AND MED.*, 1926, xxiii, 540.

of a 1-2% solution of the digested material\* and about 1 cc. of a 0.2% solution of globulin, while the respective values for the animals sensitized with globulin were about 4% and 0.0125%. In another batch of animals this difference was still definite but less considerable. But, after precipitating a 5% solution of the digestion product with an equal volume of 10% trichloroacetic acid and precipitating the supernatant fluid with alcohol the resulting substance was much more toxic for the guinea pigs sensitized with the digested material (lethal dose 0.5%) than for those sensitized with globulin (lethal dose 4% or more). Similar results were obtained by sensitizing with digested heat-coagulated egg globulin. These animals were killed by an *i. v.* injection of 1 cc. of 0.25% to 0.125% of the digestion product after fractionation with trichloroacetic acid and by 1 cc. of a 0.1% solution of unchanged globulin.

In some cases, but irregularly, the animals sensitized with peptic products succumbed to injections of 1% ovomucoid. This substance, however, can hardly be essential for the results reported since digested products of heat-coagulated globulin were more active in producing shock than those of non-coagulated globulin in animals sensitized with digestion products of the latter preparation, and also on account of the results of experiments with guinea pigs sensitized with ovomucoid itself.

## 4002

### Estimation of the Acid Combining Capacity of a Protein by Means of the Interferometer.

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The index of refraction of a mixed solution of gelatin and of hydrochloric acid as measured by an immersion refractometer has been stated to be an additive function of the indices of refraction of the individual solutions.<sup>1</sup> Using the Zeiss-Löwe interferometer, which is a differential refractometer capable of measuring small changes in refractive index to which an immersion refractometer is insensitive, the authors have found that the refractive indices of mixed solutions of gelatin and of hydrochloric acid are not additive.

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\* The lethal dose of a digestion product obtained from heat-coagulated egg globulin was 1 cc. of a 0.3 to 0.2% solution.

<sup>1</sup> Walpole, G. S., *Kolloid Z.*, 1913, xiii, 241.