after a few minutes. The 2 reagents must be so adjusted that 10 cc. of *A* should require 11 cc. of *B* to produce a permanent pink color in the presence of phenol phtalein.

Filtrates prepared by either of the 2 procedures yield sugar values (Shaffer-Hartmann method, modified reagent) substantially identical with the true sugar values obtained from tungstic acid filtrates as the difference of apparent sugar (total reduction) and reducing non-sugars (residual reduction). The zinc filtrates are free from uric acid, glutathione and ergothioneine, do not consume iodine in the presence of acid, and possess no reducing power after treatment with washed yeast.[1] Pure glucose, added to fermented zinc filtrates, is quantitatively recovered. These facts support the view, advanced by the writer in a previous paper[2] that glutathione and ergothioneine represent the bulk of the non-sugar reducing substances in blood.

The non-protein nitrogen values are lower in zinc filtrates than in tungstic acid filtrates. The difference is 8 to 15 mg. per 100 cc. of blood, a figure closely corresponding to the aggregate amount of glutathione, ergothioneine and uric acid, the substances precipitated along with the proteins. The non-protein nitrogen values of zinc filtrates seem to represent urea with creatine and creatinine. Experiments concerning the partition of non-protein nitrogen of zinc filtrates are in progress in this laboratory.

## 4300

### Growth of Rats on Diets Containing Sodium Benzoate.

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The increase in weight of young male white rats during a 40 day experimental period on diets containing sodium benzoate has been determined. The food consumption was regulated so that all of the rats received equal quantities of food of equivalent calorific value. The increase in weight of rats receiving the basal diet plus 1.5, 2.0 or 2.5% sodium benzoate was practically the same as that of rats receiving the basal diet. On the diet containing 3% sodium benzoate one-third of the rats died and the growth of the remainder

[1] Somogyi, *J. Biol. Chem.*, 1928, xxviii, 9.

[2] Somogyi, *J. Biol. Chem.*, 1927, lxxv, 33.

was distinctly less than that of the control rats even though the food consumption was the same. The addition of glycine or of gelatin to the diet containing 3% sodium benzoate resulted in growth equal to that of rats on the basal diet. These results, based upon the consumption of equal amounts of food of the same calorific value, are in agreement with our earlier experiments in which similar diets were fed *ad libitum*.

## 4301

### Apparatus for the Quantitative Testing of Air and Bone Transmitted Speech.

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The usual test for the relative acuity of hearing air and bone transmitted sound is made with a series of tuning forks—the air vibrations coming from the prongs and the bone vibrations through application of the stem to the head of the examined individual. It is well known that the greatest disability of the deafened individual is found in his inability to hear conversations. The sounds from the fork are relatively pure tones while the voice sounds are complicated combinations of tones. For this reason the fork tests are a poor criterion of the sensitivity for speech. An air telephone with its large diaphragm and efficient production of air vibrations of large amplitude and little force necessarily shows an entirely different type of response to that elicited through a bone telephone which develops small amplitudes of considerable force. A quantitative method of producing voice sounds has been developed by the Western Electric Co. in the phonograph audiometer with its electromagnetic pick-up. This instrument may also be employed with a bone telephone provided the energy is stepped up with a 2 stage audio-amplifier. It is also possible to test both the air and the bone acuity with the same receiver under the same mechanical conditions. This quite eliminates the physical peculiarities of the receiver itself and makes a direct comparison possible. The air acuity is determined by holding the receiver by its mushroom stem against a resonant surface and the person examined writes the numbers heard which become progressively fainter and fainter. Next the record is changed and the bone telephone is held against the forehead in a