casein was heated at 80° with 20 per cent. hydrochloric acid. In this case, hydrolysis was complete in ten hours, the amino nitrogen having reached its maximum, 71 per cent. of the total.

113 (523)

A demonstration of Krogh's micro-tonometer for the determination of gas tensions in fluids.

By **M. M. SCARBROUGH.** (By invitation.)

[*From the Physiological Laboratory, Department of Medicine, Yale University.*]

The advantages of Krogh's apparatus are, first, the small amount of fluid required; second, the large specific surface obtained; third, the rapidity and accuracy of determinations. The bubble of gas used is about 2 mm. in diameter, having a specific surface of 30 as compared with a specific surface of 3.3 in Pflüger's aërotonometer, 5.2 in Bohr's hemataërometer and 3.7 in Fredericq's. A fine spray of the fluid to be examined is played on the bubble for a few minutes; the bubble is then drawn into a capillary burette where it is measured before and after the absorption of oxygen and carbon dioxide. For carbon dioxide alone in fluids, a very simple vessel is used; the tonometry is accomplished by shaking a small bubble of air with a relatively large amount of fluid. The bubble is then transferred to the capillary burette and analyzed. The limit of error can be brought down to + 0.2 per cent.[1]

114 (524)

Breeding experiments in poultry.

By **H. D. GOODALE.** (By invitation.)

A. *Note on the Results of a White Leghorn by White Plymouth Rock Cross.*

The cross was made in only one way, viz., white Leghorn females × White Plymouth Rock males. The chicks were white with sometimes a few black spots. They developed into white birds, with a few black spots. Later the surface color became

[1]For full description of apparatus and methods see Krogh's articles in *Skandinavisches Archiv für Physiologie*, 1908, xx, 259–288.

dulled owing to the development of minute spots of pigment. At the same time, faint bars developed in some birds though they were wanting in others. F_2 contains white, black, gray and barred chicks, the last exactly like those of Barred Plymouth Rocks.

B. *Peculiarities in Inheritance of Brown Leghorn Color in Relation to Sex.*

Experiment I.—Brown Leghorn females × White Plymouth Rock males gave both sexes barred. The males are splashed with Brown Leghorn color, which is lacking in the females.

Experiment II.—White Plymouth Rock females × Brown Leghorn males gave barred males like those of Experiment I. The females are either nearly black with orange hackle or else approach fairly closely the color of a Brown Leghorn female. The White Plymouth Rock females appear then to be heterozygous for barring, and the Brown Leghorn females for some factor for color or pattern.

Experiment III.—F_1, females from Experiment I, bred to their father gave 27 white and 26 barred chicks. Even the males that were reared showed no trace of Brown Leghorn color.

Experiment IV.—White Plymouth Rock females × a male from Experiment I thus far have given 1 black, 14 white, 6 barred, 2 Brown Leghorn.

Experiment V.—F_1, females (Experiment I) × brown Leghorn male has given 12 barred, 5 black, 11 Leghorn, 4 modified Leghorn.

Experiment VI.—F_1, females (Experiment I) × White Langshan male (gametic constitution unknown) is giving black, white, barred and red chicks. The reds probably come from the father.

Experiment VII.—F_2, barred females (Experiment III) × White Langshan male is giving white, black and barred chicks.

Experiment VIII.—F_2, white females (Experiment III) × White Langshan male is giving only whites.

Experiment IX.—F_1, females (Experiment II) × White Langshan is giving white, black and reddish chicks.

Experiment X.—F_1, females (Experiment II) × White Rock is giving barred and white chicks.

Since Experiment III produced no Brown Leghorn chicks and since such occurred in Experiment IV, we are justified in believing that the Brown Leghorn color exists in a heterozygous condition in the female but not in the male, thus confirming Bateson's theory of sex. As this color pattern is nearly, if not quite identical with that of *Gallus bankiva*, it will be interesting to know if the heterozygous condition is common to all the domestic races of poultry bearing this ancestral color. Hagedoorn has described such a case, but also describes the reverse, *i. e.*, heterozygous males and homozygous females.