

Weston Electrical Instrument Corporation when we had furnished them with the following information: Nature of the thermocouple, range of temperature desired and total resistance in ohms of the thermocouple and its leads. Comparison of the readings of this instrument with the calculated temperature from e.m.f. measurements from room temperature to 1000° C. agreed to within  $\pm 10^\circ$  C. As the temperature of various points within the oven may vary by as much as  $\pm 25^\circ$  C., this accuracy is quite adequate.

WILLIAM C. STADIE

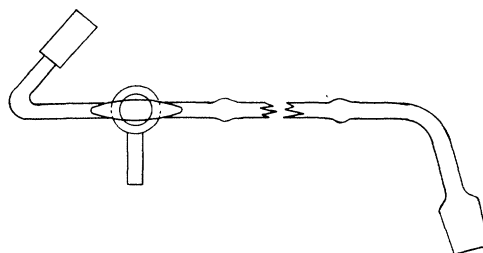
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#### MODIFICATION OF THE BACKLIN-KIRK COMBUSTION CHAMBER FOR MICRO- DETERMINATION OF CARBON AND LIPOIDS

IN the manometric determination of lipoids the combustion chamber is highly evacuated at the time it is to be removed from the Van Slyke manometer. In the original Backlin chamber<sup>1</sup> a stop-cock is present at the top of the combustion chamber which may be opened at this time to relieve this pressure which

facilitates removal of the rubber connection to the manometer. At best this operation involves some risk of damaging the manometer. The chamber, as modified by Kirk,<sup>2</sup> has eliminated this stop-cock, thus necessitating removal of the rubber connection against the low internal pressure of the chamber. A simple method of reducing the hazards of such procedure is to add a three-way stop-cock (cf. diagram) in the



delivery tube of the chamber. After the upper cock of the Van Slyke absorption chamber has been closed this stop-cock may be turned to admit atmospheric pressure before detaching the delivery tube.

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## SPECIAL ARTICLES

### A PROOF OF THE LAW OF EFFECT

PSYCHOLOGISTS and physiologists all agree that the behavior of man and of many other animals is modifiable by the experiences of life. He learns, so that the situation, S, which at first evokes, say, responses 1, 2, 3, 4 and 5 equally often, comes to evoke one response, say 4, always or ninety-nine times out of a hundred. The connection  $S \rightarrow 4$  has become enormously strengthened relatively to  $S \rightarrow 1$  or  $S \rightarrow 2$  or  $S \rightarrow 3$  or  $S \rightarrow 5$ .

Concerning the forces producing learning there has been great disagreement. The writer (1898, 1914 and 1931) has maintained that the after-effects of a modifiable connection work back upon it, and that, in particular, a satisfying state of affairs accompanying or directly following a connection strengthens it. Troland maintained a similar doctrine.

The great majority of psychologists have maintained, on the contrary, that the strengthening of any connection is due to forces operating within the connection itself or prior to it. Repetition or frequency of occurrence, recency, intensity, finality or consummatoriness, tendency to attain equilibrium, and other features of the process have been alleged to be adequate to explain the strengthening of connections.

I have presented recently evidence from a variety

of experiments to show that a satisfying after-effect of a connection does in fact strengthen it under conditions equalized in respect of all other forces than the satisfying after-effect.<sup>1</sup> It is the purpose of this report to present an entirely independent experimental proof of the strengthening influence of a satisfying state of affairs upon the connection of which it is the after-effect and important new facts concerning the method of action of that influence.

We provide in an experiment a long series of situations to each of which several responses are possible, one of which is arbitrarily followed by a reward, any other being followed by a punishment. For example, a series of words is said by the experimenter, to each of which the subject may respond by any number from 1 to 10. If he says the number that has been chosen to be "right" he is rewarded; if he says any other, he is punished. So we have a long sequence of connections and after-effects, in the form Word 1  $\rightarrow$  number, reward or punishment, Word 2  $\rightarrow$  number, reward or punishment, Word 3  $\rightarrow$  number, reward or punishment, Word 4  $\rightarrow$  number, reward or punishment, etc.

<sup>2</sup> Peters and Van Slyke, "Quantitative Clinical Chemistry-Methods," Williams and Wilkins, 1932.

<sup>1</sup> "The Fundamentals of Learning," E. L. Thorndike, 1932.

<sup>1</sup> E. Backlin, *Biochem. Zts.*, 217: 483, 1930.