incubation for 36 hours at 37° C. by turbidity measurements using the Evelyn electrophotometer.

One gram of pork liver, found by animal assay to contain 36 micrograms of vitamin B_1 per gram, was extracted four times for periods of five minutes each with boiling N/10 hydrochloric acid. This extract was adjusted to pH 7.0 with sterile sodium hydroxide and made up to 100 ml. The actual amount of vitamin B_1 present in dilutions of pork liver extract was calculated by comparing the resultant stimulation with that of known quantities of vitamin B_1 (see Fig. 1). The ordinates represent per cent. increase in light absorption due to turbidity, upon addition of the amounts of stimulant indicated on the abscissae. Those points falling on the steep part of the curve were selected for calculations. By obtaining several points in this region, a convenient check for a given determination is provided. An average from four separate determinations, none of which varied over 3 per cent. from the mean, was 32 micrograms vitamin B_1 per gram. Similar confirmations of the accuracy of the method when applied to biological materials were obtained with standardized samples of pork kidney and ham.

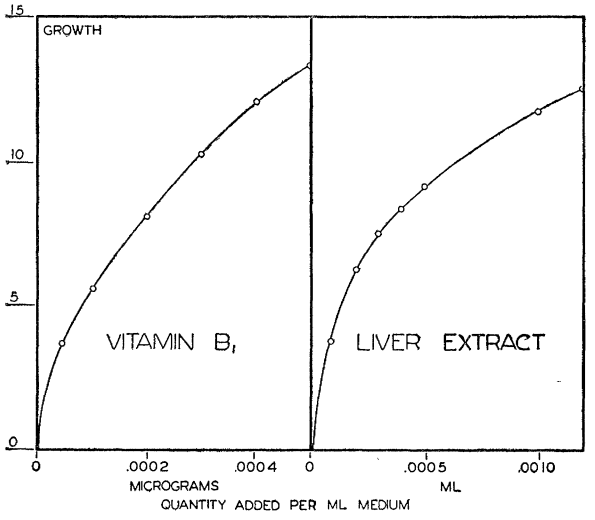

FIG. 1. Influence of vitamin B_1 on growth of *Staphylococcus aureus*. On left, the standard curve for pure vitamin B_1. On right, curve for liver extract to be assayed for vitamin B_1.

Six weeks' old cultures of *R. trifolii*, grown on a vitamin B_1-free synthetic medium were heated 15 minutes at 100° C. with N/10 HCl. This sufficed to liberate the free vitamin from combined form in which it apparently exists in the autolyzed cultures. Various cultures assayed averaged 19.6 micrograms of vitamin B_1 per gram of dry cells. This figure was in agreement with analyses by Meikeljohn's modification of Schopfer's test[4] which, however, is much less sensitive to vitamin B_1 and requires ten days for completion. From the data obtained, it appears that the vitamin B_1 content of *Rhizobium trifolii* cells closely approximates the amount known to be present in yeasts.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

APPARATUS TO ASSIST IN PHOTOGRAPHING EXPERIMENTAL MATERIAL[1]

THE apparatus described herewith has proved to be a very convenient device for photographing laboratory specimens, especially small animals such as rats. The advantages of this apparatus lie in the fact that photographs are taken in the laboratory under uniform conditions of distance and light and at about one-tenth the usual cost when made by a commercial photographer, for the individual photographs, and less than one half the usual cost for the pictures finally selected and enlarged for printing. In addition to a saving of time, the animals are not exposed to abnormal conditions outside the laboratory.

The apparatus consists of a boxlike arrangement with an opening at one end for inserting a camera and a hinged door at the opposite end for inserting the specimens to be photographed. A lamp recess is located on each side of the box. The insides of the lamp recesses are painted with white enamel. The inside of the box in which the camera is placed is painted black. A removable glass partition, made of clear window glass 9″ by 18″, with a wing 4″ wide cemented 1″ from each end is used to retain rats within 4″ of the hinged back door. The hinged door carries a gray cardboard, which serves as a background. Gray is desirable as a background for most objects, but since the cardboard is attached with thumbtacks, other colors may be readily substituted as a suitable contrasting background for the particular specimen to be photographed. A yellow cardboard makes a desirable floor when rats are being photographed. A 15-centimeter rule for showing comparative sizes, and a white card with sufficient data to identify the specimen, the date and the number of the particular photograph are attached to the door. These become an integral part of the photograph, but, if placed on the upper part of the door, may be blotted

[1] Published with the approval of the director of the New Mexico Agricultural Experiment Station.

[4] A. P. Meikeljohn, *Biochem. Jour.*, 31: 1441–1451, 1937.

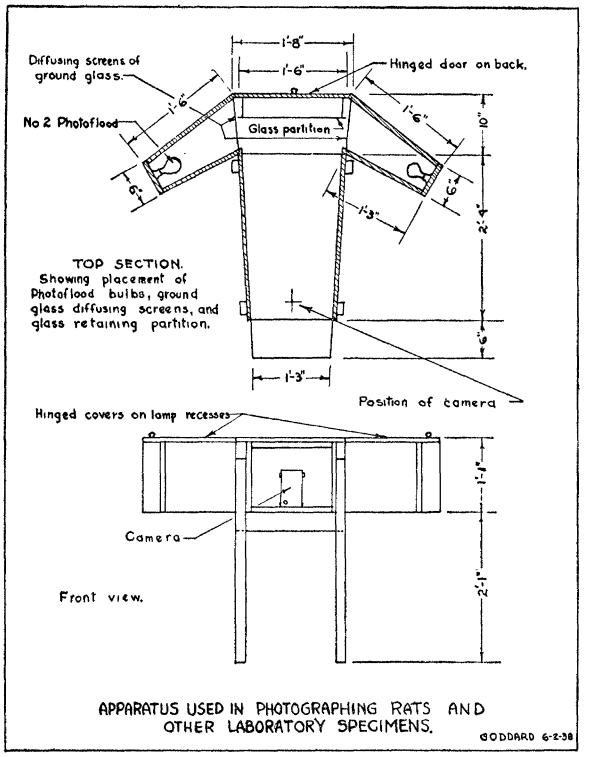

FIG. 1. Apparatus designed at the New Mexico Agricultural Experiment Station to assist in photographing rats and other laboratory specimens. The camera lens is placed 30 inches from the hinged door. The removable glass partition is 9″ × 18″ with four-inch wings cemented one inch from each end.

from the picture later if desired. A switch and plug-in light cord are attached to one side of the hinged back door. The dimensions given in Fig. 1 are for an apparatus to accommodate an Eastman kodak number 620, with a portrait attachment. Using supersensitive film, excellent photographs are secured with the lens of the kodak set 30 inches from the back wall, and with the kodak set for 1/25 second, an opening of 16, and the distance set as close as possible, slightly less than 5 feet. The objects photographed in this manner are approximately 14 per cent. of natural size, and when enlarged 3½ times, are ½ natural size. A photograph of a full-grown rat would thus be accommodated in the average journal page that is about 4⅓ inches wide. The dimensions given may readily be adapted to other cameras.

L. H. ADDINGTON

PHOTOELECTRIC "COLORIMETERS"

MESSRS. HARE AND PHIPPS, in SCIENCE, 88: 153, 1938, refer to certain alleged difficulties with the use of a single photocell in a photoelectric colorimeter, citing them as reasons for the development of another two-cell instrument. Inasmuch as such statements—though made, perhaps, because of insufficient information about a rapidly developing art—may create prejudice, it seems fair to present a correct statement regarding one of the instruments to which reference is made.

The authors state that the use of a single cell "requires a constant light source, the constancy of which is maintained by variable resistances in the lamp circuit, by a trickle charger on to a storage battery, or by a diaphragm placed between the lamp and the absorption cell." Of the three arrangements mentioned, the first makes possible the adjustment of current from a storage battery, whether or not the latter is kept on charge; but the light source is not thereby maintained constant except by manual setting. Obviously the purpose of the diaphragm can not be to maintain the light source at constant brightness.

The alleged difficulty of keeping the light source constant has been completely obviated in the Sheard-Sanford instrument through the use of a specially designed transformer which, on a source of constant frequency alternating current, maintains a constant power output regardless of voltage variations in the input. The purpose of the adjustable diaphragm is entirely different. It enables the operator to make precise adjustment of the amount of total light flux reaching the photocell, but does not affect the constancy of the light source. Neither are measurements with the Sheard-Sanford "Photelometer" affected by error "from the variations in the current produced by the cell caused by fatigue and changing temperature."

The Sheard-Sanford "Photelometer" is covered by U. S. Patents Nos. 2,051,317 and 2,051,320, the specifications in which disclose completely the principles employed in obtaining accurate measurements with a single photocell. All royalties from the sale of "Photelometers" have been assigned by Drs. Sheard and Sanford to the American Society of Clinical Pathologists.

P. E. KLOPSTEG

CENTRAL SCIENTIFIC COMPANY

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