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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

ANNUAL MEETING AT CLEVELAND, OHIO, SEPTEMBER 11–16, 1944

By Dr. F. R. MOULTON
PERMANENT SECRETARY

AFTER cancelling meetings for two years on request of the Office of Defense Transportation because of transportation difficulties, the association will hold its annual meeting for 1944 in Cleveland, Ohio, from September 11 to September 16, inclusive. All affiliated and associated societies have been invited to participate in the meeting so far as it may be possible for them to do so. If transportation conditions are favorable, the meeting will be well attended; if there are serious traffic congestions in September, it will be streamlined to the extent that may be necessary.

September was chosen as the time for the meeting, first, because the holiday seasons must be avoided, and, second, because for at least some colleges and universities this is an open period between sessions. In particular, it is the week at Case School of Applied Science between the departure of one group of trainees and the arrival of another group, and it is the week between the summer and autumn sessions at Western Reserve University. Since Case School of Applied Science will provide several meeting rooms and Western Reserve University a large number, this consideration is very important. After the close of the war annual meetings of the association will be held again at the Christmas holiday season or perhaps at some other time that may be more advantageous. Such questions will be open for consideration after the Cleveland meeting.

Cleveland was chosen for the place of meeting because it is about the only city in the country that now

4 mm, 24-gauge nichrome wire loop,[5] 2 loopfuls of the undiluted standard (in this case a *P. notatum*[6] filtrate of known potency) were placed upon one disc and, after flaming the loop, a second disc was treated with 2 loopfuls of 1:4 aqueous dilution of the standard filtrate. Similarly, 2 loopfuls of the undiluted unknown (the unfiltered infranatant solution from a growing culture) were placed on the third disc and 2 loopfuls of a 1:4 dilution of the unknown on the fourth disc. Plates were prepared in quadruplicate and incubated immediately after treatment. An incubation period of 5½ hours at 37° C resulted in growth sufficiently heavy to permit measurement of the clear zone of inhibition with a mm rule. The results are given in Table 1.

TABLE 1

DIAMETER OF ZONES OF INHIBITION IN MM

	Standard		Unknown	
	Diluted 1 to 4 or 25 per cent.	Undiluted or 100 per cent.	Diluted 1 to 4 or 25 per cent.	Undiluted or 100 per cent.
Plate I . . .	27.5	32.5	23.5	29.5
Plate II . .	27	31.5	23	28
Plate III . .	26.5	31	24	29
Plate IV . .	27	32	25	30
Sums . .	$108.0 = S_1$	$127.0 = S_2$	$95.5 = U_1$	$116.5 = U_2$

The potency expressed as percentage of the standard may be readily calculated with the aid of the following simple equation[7] in which 2 is the factor for converting to per cent., d is the log of the ratio of the greater dose to the smaller dose (here d = log 4 or 0.602) and the other terms are those indicated in the table.

$$\text{Potency} = \text{antilog}\left(2 + d\,\frac{(U_2+U_1)-(S_2+S_1)}{(U_2-U_1)+(S_2-S_1)}\right)$$

On substituting the data of Table 1, it was found that the unknown was 45 per cent. as potent as the standard.

$$\text{Potency} = \text{antilog}\left(2 + 0.602\,\left\{\frac{(116.5+95.5)-(127.0+108.0)}{(116.5-95.5)+(127.0-108.0)}\right\}\right)$$

Potency = antilog 1.6538 = 45%.

Using the method of factorial analysis described by Bliss,[8] it was found that the average standard error was 4.3 and that the slope of the line was 8.3.

Illustrating the reproducibility of results, two independent workers assayed two different preparations and found 11 per cent. and 12 per cent. potency for the weaker solution and 80 per cent. and 84 per cent. for the stronger.

In these antibacterial assays, the loop was found to give the same order of accuracy as micropipettes but to afford greater ease of manipulation and to eliminate much washing and sterilization.

Up to the present, experiments have been done with penicillin, clavacin and gliotoxin. *B. subtilis* was found to be a more convenient test organism than *Staph. aureus, E. typhosa,* or *D. pneumoniae* types I, II and III.

Since the response is affected by the temperature and duration of incubation, the volume of the dose, the size of disc, the depth of the agar and the number of *B. subtilis* organisms per plate, these factors must be kept relatively constant. A more complete study of the method, together with data on the above-mentioned variables, will be presented elsewhere.

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[5] Constructed as described in reference 2. The use of short, wide tubes led to more uniform loopfuls of solution.

[6] The authors are indebted to Dr. K. B. Raper, of the Northern Regional Research Laboratory, Peoria, Ill., for cultures of *P. notatum;* to Dr. S. A. Waksman, of the N. J. Agricultural Expt. Station, New Brunswick, N. J., for a culture of *A. clavatus;* and to Dr. J. W. Foster, of Merck and Company, Rahway, N. J., for cultures of *Staph. aureus* and *B. subtilis.*

[7] The equation is derived as follows: The average of the responses for the standard solutions, $\frac{S_2+S_1}{2N}$ (where N represents the number of responses per dose), is subtracted from the average of the responses for the unknown solutions $\frac{U_2+U_1}{2N}$ and the resulting difference is converted into a logarithm by dividing by b_c, the average slope of the two dose-response curves. The antilog of this logarithm is the potency of the unknown in terms of the standard and may be expressed on a percentage basis by multiplying by 100. It is more convenient, however, to carry out this multiplication while the potency ratio is still in logarithmic form by adding it to 2, the logarithm of 100. Combining $\frac{1}{2}\left(\frac{U_2-U_1}{Nd}+\frac{S_2-S_1}{Nd}\right)$, which is the formula for b_c, with the above steps results in the following equation:

$$\text{Potency} = \text{antilog}\left(2+\left[\frac{1}{\frac{1}{2}\left\{\frac{U_2-U_1}{Nd}+\frac{S_2-S_1}{Nd}\right\}}\right]\left[\frac{U_2-U_1}{2N}-\frac{S_2-S_1}{2N}\right]\right)$$

which reduces to the simple expression given in the text.

[8] C. I. Bliss and H. P. Marks, *Quart. Jour. Pharm. Pharmacol.*, 14: 182, 1939.

BOOKS RECEIVED

BAILEY, C. H. *The Constituents of Wheat and Wheat Products.* Illustrated. Pp. 332. Reinhold Publishing Corporation. $6.50.

FEJOS, PAUL. *Ethnography of the Yagua.* Illustrated. 56 plates. Pp. 144. Viking Fund, 10 Rockefeller Plaza, New York City. $3.50.

ROSEN, GEORGE. *The History of Miners' Diseases. A Medical and Social Interpretation.* Illustrated. Pp. xii + 490. Schuman's. $8.50.

STEWART, OSCAR M. *Physics.* A Textbook for Colleges. Fourth edition. Illustrated. Pp. x + 785. Ginn and Company. $4.00.