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THE PROMISE OF TECHNOLOGY[1]

By Dr. FRANK B. JEWETT

VICE-PRESIDENT OF THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY

PROGNOSTICATION, and especially long-range prognostication of technological advances, particularly those related to new sectors, is an extremely hazardous performance even in normal times. When one attempts to make prognostications for a postwar peacetime period, when one is in the midst of the turmoil of war, it is a hazardous undertaking raised to the nth power. The reason for this is because of certain very fundamental conditions affecting science and technology during a war era.

In the first place, technology is itself so vast a subject and covers such a wide range of applied science that no man in the world is wise enough at any time to predict the future except for a very short distance ahead and in very limited sectors. Even so, he can not have any great assurance of being right.

During the war period there is added to the normal uncertainties the fact that no one in the world has the slightest idea of what kind of a world we are destined to live in when the show is over. Further, no one can say with certainty when the period of active warfare will cease and the period of peace will begin. Nor can any one say with assurance what changes in science and technology will occur during the interval of active warfare still ahead of us. The present tempo of applied science to the art of human destruction and defense against that destruction is

[1] The ninth address of the second series of conferences on "Postwar Goals and Economic Reconstruction" held under the auspices of the Institute on Postwar Reconstruction of New York University. Dr. Arnold J. Zurcher, director of the institute, presented Dr. Jewett and said in part: "We have not only an engineer this evening, but we also have, I suppose, one of the most distinguished engineers in the country. In a long list of persons who have been submitted to our attention as the kind of person whom we ought to invite, Dr. Jewett stood at the head, and we are very fortunate indeed in getting him to consent to come over here this evening and talk to us." This address, together with the discussion, will become part of a volume on "Postwar Goals and Economic Reconstruction," published by the university.

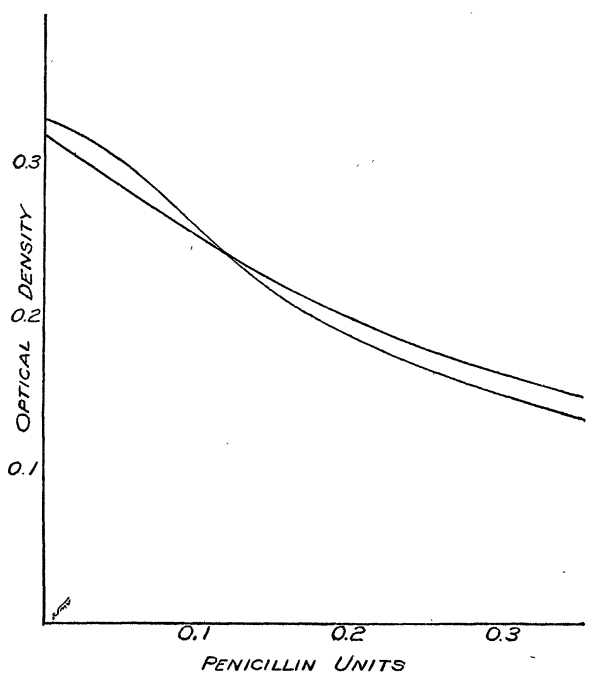
are for the standard which is run in duplicate. For each unknown solution to be assayed, prepare one additional row of nine tubes.

Prepare a solution containing 0.5 unit per cc of the penicillin standard in cold sterile distilled water and add to the broth tubes according to the amounts in column 3. From estimated values of units for the unknown samples, prepare a solution of each which contains an estimated 0.5 unit per cc. Add these solutions to their respective rows of tubes in the same manner as the standard. Place into each tube (except for the last which serves as a colorimetric and sterility control) 0.4 cc of an 18–20 hour culture of *Staphylococcus aureus* (National Institute of Health No. 209). The culture is prepared by inoculating a flask containing Veal-Glucose Broth from an agar slant. This resulting suspension, which is used as the inoculum, should have an optical density of about 0.4.

Place the tubes into an incubator or constant temperature water-bath at 37° C for 4 hours or until the optical density of the control tube reaches about 0.30 (0.27 to 0.34 has been found to be satisfactory). (A constant temperature water-bath has been found to give more consistent results and hence a smoother curve). At the end of the growing period immerse the tubes in cold water (about 10° C or less) to stop active growth of bacteria. After cooling, the tubes should be wiped dry and shaken thoroughly.

Measure the density of each tube by means of a photoelectric colorimeter[3] using a red filter. These values are recorded opposite their corresponding tubes, as may be seen in Table 1, a typical protocol.

The densities are plotted as the ordinates against penicillin units as the abscissae. A smooth curve is drawn through these points. This is done for each row of tubes representing the standard, thus giving two curves which correspond to the duplicate standard. A line is then drawn halfway between these two curves and serves as the average curve which is employed in the calculation of the number of units in the samples of unknown strengths. This calculation is explained in Table 2.



[3] Lumetron. Manufactured by Photovolt Corp., New York City.

TABLE 2

A Units of penicillin in standard	Optical density of unknown	B Units of unknown (read from curve)	C Estimated units of unknown	Units of unknown $\frac{B}{A}$ C =
0.05	0.29	0.056	5000	5600*
0.10	0.26	0.096	"	4800
0.15	0.23	0.136	"	4500
0.20	0.21	0.168	"	4200
0.25	0.19	0.210	"	4200
0.30	0.17	0.260	"	4330
0.35	0.16	0.290	"	4150
				Av. = 4370

* Not used in calculation because 5600 is definitely out of range.

Values obtained by this method are characteristically in good agreement. Consecutive assays on two samples were 48300, 47600, 45300, 49400 and 1675, 1516, 1300, 1580, respectively. In five consecutive days the units per cc of one standard as calculated from the curve of its duplicate were 0.495; 0.52; 0.45; 0.52 and 0.49, respectively.

Appreciation is hereby expressed for the technical assistance given by Dr. J. M. Vandenbelt of this laboratory.

D. A. JOSLYN

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BOOKS RECEIVED

BILLINGTON, CECIL. *Shrubs of Michigan.* Illustrated. Pp. 249. Cranbrook Institute of Science. $2.50.

CHAPIN, WILLIAM H. and L. E. STEINER. *Second Year College Chemistry.* Fifth edition. Illustrated. Pp. vii + 575. John Wiley and Sons. $3.75.

CHESNEY, ALAN M. *The Johns Hopkins Hospital and The Johns Hopkins University School of Medicine. A Chronicle.* Volume I, 1867–1893. Illustrated. Pp. xviii + 318. The Johns Hopkins Press. $3.00.

D'ALELIO, G. F. *A Laboratory Manual of Plastics and Synthetic Resins.* Pp. vii + 134. John Wiley and Sons, Inc. $2.00.

FRANCIS, CHARLOTTE A. and EDNA C. MORSE. *Fundamentals of Chemistry and Applications.* Illustrated. Pp. xi + 537. The Macmillan Company. $3.50.

MCCAY, CLIVE M. *Nutrition of the Dog.* Illustrated. Pp. 140. Comstock Publishing Company. $1.50.

TAUBER, HENRY. *Enzyme Technology.* Illustrated. Pp. vii + 275. John Wiley and Son. $3.50.