be minimized by designing the apparatus so that the time required for removal of water from E is small as compared to the time necessary for liquid in C to reach level *c*. Although the dimensions of chamber E (Fig. 1a) are satisfactory for aeration of plant root systems, the time interval between cessation of siphoning and production of a closed system in E upon reaching level *f* can be reduced if continuous aeration is desirable for some other purpose. This can be accomplished by constructing the chamber as shown in Fig. 1b. The advantage of a slight increase in efficiency is consequently attained at the expense of a more elaborate design, which decreases to some degree the simplicity of the original apparatus.

It has been found that, in order to maintain the described continuity in the rate of aeration with the apparatus in Fig. 1a, the relationship between height K of siphon tube C and head of water *d* to be overcome in the culture tank can be formulated by the following approximation: $K = 2.2d$. Obviously, this relationship is only applicable if the dimensions of chamber E and diameter of glass tubing used are equivalent to the specifications outlined in Fig. 1a.

The aeration equipment described in this paper was constructed with siphon tubes of several dimensions and used successfully for aeration of culture solutions of various depths. The apparatus has been used continually for periods of more than thirty days at one time, and with the exception of occasional minor adjustments of the rate of water flow due to slight fluctuations in the pressure of the main water supply, no difficulty was experienced.

Prozones and Blocking Effect in Normal Iso- and Hetero-Agglutination With Cord Sera

HERBERT H. LUBINSKI
Jewish General Hospital, Montreal, Canada

Wiener (*2*) has recently described a blocking test for Rh sensitization as a method to detect specific antibodies in anti Rh sera, which otherwise fail to demonstrate the usual *in vitro* agglutination phenomena. He has also demonstrated that these blocking antibodies are the cause of the prozone phenomenon, which may be observed, not infrequently, in anti Rh agglutination.

Using the blocking technique, Levine and Gilmore (*1*) were able to obtain a blocking effect with the serum derived from a patient suffering from infectious mononucleosis in which the Paul Bunnel reaction was negative. The effect was quite analogous to that observed in Rh negative mothers of erythroblastotic infants.

The opportunity presented itself to the writer to test the relation of blocking antibodies to the prozone phenomenon in normal iso- and hetero-agglutination. During a study on cord sera four sera were found among several hundred which showed a more or less marked inhibition zone. These sera, which had been stored at refrigerator temperature for 2 to 3 weeks, were used to search for the presence of blocking antibodies. The sera were all group O.

Technique: Previously unheated serum (0.2 cc.) was diluted in increasing amounts with 0.2 cc. of saline and 0.1 cc. of a 2.5 per cent suspension of thrice-washed red cells added. The mixture was shaken well and centrifugalized for 2 minutes at a speed of 1,200 rpm. A first reading was then made, to see if an inhibition zone was present. After renewed centrifugalization the supernatant fluid was withdrawn and replaced by a type-specific serum diluted to such a degree that it still gave a 4+ reaction with the red cells used in the experiment. The tubes were then thoroughly shaken, centrifugalized a third time and readings made. Two tests were done with A and B cells, respectively, and two with rabbit cells. The results are given in Table 1. They show

TABLE 1
SERUM—DILUTION

Serum	Red cells	undil.	1/2	1/4	1/8	1/16	1/32	Nature of test
1652	B	−	−	±	3+	2+	±	Direct titration
		1+	2+	4+	4+	4+	4+	Blocking
1818	A	1+	2+	4+	4+	2+	1+	Direct titration
		1+	3+	4+	4+	4+	4+	Blocking
1819	Rabbit	−	2+	4+	4+	3+	1+	Direct titration
		2+	4+	4+	4+	4+	4+	Blocking*
		±	2+	4+	4+	4+	4+	Blocking†
1863	Rabbit	1+	2+	4+	4+	3+	1+	Direct titration
		1+	2+	4+	4+	4+	4+	Blocking

* Testing serum diluted 1/2.
† " " " 1/32.

that in the prozone the added serum could not achieve a complete agglutination, whereas in the highest dilutions 2+ and 1+ reactions as well as the negative were changed to 4+, thus demonstrating a blocking effect of the tested cord sera.

The question as to the nature of the blocking antibodies is still open to speculation. Wiener regards them as "an antibody having the capacity of combining with the sensitive cells without producing a visible reaction. After proper absorption the serum may give a positive agglutination reaction." One may think of an agglutinoid, *i.e.* an agglutinin which has lost the agglutinating part and consists of the hapto-

phore group only, similar to the relation of toxin and toxoid. However, another explanation may be that the blocking antibodies are identical with the hemolysin, which combines with the same cell receptor as the agglutinin. This theory assumes, of course, that agglutinins and hemolysins are different antibodies. Whatever it may be, it must have a greater avidity for the red cells than the agglutinin.

However, in the cases described above another possible explanation has to be considered for the following reason. It was found that the prozone phenomenon, which was observed on unheated sera, disappeared and was replaced by a 4+ agglutination, when the sera were previously heated for 30 minutes at 56° C. Since the tests were made after the sera had been kept in the refrigerator for 2 to 3 weeks, complement can be excluded as the cause of the prozones. It may therefore be possible that a heat-labile substance is present in cord sera which is responsible for the prozone phenomenon and the blocking effect with this type of sera.

Therefore, it seems that the inhibition zone as well as the blocking effect can be caused by different agents.

References

1. LEVINE, PH., and GILMORE, E. L. *Science*, 1945, **101**, 411.
2. WIENER, A. S. *Proc. Soc. exp. Biol. Med.*, 1944, **56**, 173.

News and Notes

Dr. Mark W. Woods has rejoined the staff of the Department of Botany at the University of Maryland after three years in the Armed Forces. He began his duties as associate professor of plant pathology on 1 December 1945.

Dr. Hyman I. Goldstein, Camden, New Jersey, has been appointed professor of the history of medicine, Essex College of Medicine and Surgery, Newark, New Jersey, and will deliver weekly lectures.

Dr. Harold Blum, of the U. S. Public Health Laboratory, Bethesda, Maryland, conducted a special conference at the University of Texas Medical Branch, Galveston, on the "Influence of Sunlight on Carcinogenesis," on 8 January. Dr. Blum has recently been awarded a Guggenheim Fellowship for the study of thermodynamic factors in evolution.

Dr. Donald Duncan, professor of anatomy at Louisiana State University Medical School, New Orleans, has accepted an appointment as professor of anatomy and chairman of the Department of Anatomy at the University of Texas Medical School, Galveston, and will assume his new post on 1 February.

Dr. Henry R. Kreider has been appointed chief chemist of The Wm. S. Merrell Company, Cincinnati, Ohio.

Dr. Richard J. Lund, mineral economist, geologist, and one-time director of the Miscellaneous Minerals Division of the War Production Board, has joined the staff of Battelle Institute, Columbus, Ohio. Prior to his three-year association with WPB, Dr. Lund served as consultant on miscellaneous minerals to the old Office of Production Management and Defense Commission, and earlier was for three years (1937–1940) editor of the *Mining Congress Journal.*

Col. James A. Tobey was decorated on 4 December 1945 with the Ordre de la Santé Publique, grade of Officier, by the French Republic. The presentation was made in Stuttgart, Germany, by Inspecteur General Coulon. Col. Tobey returned on 24 December to his home in Rye, New York, after two years and eight months service overseas, the last seven months as Deputy Military Governor of Wurttemberg-Baden in Germany.

Dr. Robert Simha has become a member of the Division of Organic and Fibrous Materials of the National Bureau of Standards, with special responsibility for the coordination of fundamental research on the molecular properties of high polymers.

Dr. Hugh L. Dryden has been appointed assistant director of the National Bureau of Standards. His services in this capacity will supplement those of Mr. E. C. Crittenden, who has served as assistant director for many years and who will continue in that capacity.

Dr. Ferdinand G. Brickwedde has been designated chief of the Heat and Power Division of the National Bureau of Standards, succeeding Dr. H. C. Dickinson, who retired on 31 October. Dr. Brickwedde has been with the Bureau since 1925.

Frederick S. Bacon, chemical research consultant, announces the formation of a partnership with Philip D. Wilkinson under the name of Frederick S. Bacon Laboratories. The new firm will continue the chemical research and consultation business established in 1939