

The solutions of sodium acetate and of 0.5 per cent. phenol were made up in physiologic sodium chlorid solution (0.85 per cent.) in distilled water. I have not as yet determined whether 0.5 per cent. phenol or camphor crystals will preserve complement or, if so, whether either would act better than sodium acetate. It has been shown that a minute crystal of camphor will, by inhibiting germ growth, preserve amboceptor and stabilize its unit of strength. In passing I desire to recommend the formaldehyd method for preserving red cells.²

Ordinarily red cells kept in physiologic sodium chlorid solution in the refrigerator will begin to hemolyze in about forty-eight hours. When the formaldehyd solution (1.25 c.c. solution of formaldehyd in 1,000 c.c. physiologic sodium chlorid solution) is used, hemolysis begins in about a week. The formaldehyd must be washed out before use, as it is anticomplementary. My procedure is to take the human cells left on separating patient's serum, cover them without washing with about five volumes of the formaldehyd solution, and keep in an ice box. They are washed when needed.

For the preservation of complement I have found that sodium acetate is ideal. It has the following properties:

- (a) It has no hemolytic action.
- (b) It is not anticomplementary.
- (c) The solution can be sterilized.
- (d) Dissolved in physiologic sodium chlorid solution, it has the same hydrogen ion concentration as blood P_H 7.4.
- (e) It preserves and stabilizes complement from two to three months in the ice box, or two weeks at room temperature.
- (f) It can be used in any strength from 5 to 50 per cent. or in crystal form.
- (g) Its preservative properties are not antibacterial, and therefore must be physicochemical.
- (h) Added to whole blood in certain strengths, it prevents coagulation.
- (i) It will preserve human complement.³

In preparing complement, it is best to sever the neck arteries of the guinea-pig and obtain all the blood. As soon as the clot is well formed, it is broken up gently and centrifugalized. The serum is pipetted off and a 40 per cent. dilution of all the serum immediately made with 12 per cent. sodium acetate solution, thus preserving the full complementary strength. Placed in the ice box, it will keep until the whole amount is used up. In this dilution the final concentration of acetate is two thirds of 12, or 8 per cent.

From 10 to 12 per cent. stock solutions of sodium acetate work best for the following reasons: Sodium acetate has weak bactericidal power, so that a 50 per cent. solution keeps the serum clearer than does a 5 per cent. solution. If the serum diluted with a 5 per cent. sodium acetate solution is contaminated, it spoils rapidly, losing its complementary activity in four weeks or less in the ice box. On the other hand, although the 50 per cent. acetate solution prevents germ growth except mold, there comes a time, usually in about three weeks, when this complement solution suddenly becomes inert. (Fifty per cent. or saturated sodium acetate solution added to serum to make a 40 per cent. dilution causes a slight crystalline precipitate, the supernatant fluid containing the complement.) Using from 10 to 12 per cent. sodium acetate solution as the diluent and making a 40 per cent. dilution of the guinea-pig serum is the ideal. Such a complement solution prepared sterilely has retained its complementary activity as long as three months in the refrigerator and for two weeks at room temperature in a sunlit window in August. The loss in unit strength is gradual, about 0.02 per week. For example, a 40 per cent. acetate complement dilution, the Wassermann unit of which would be 0.1 c.c., would probably be 0.125 the second week and 0.15 the third or fourth week.

On account of the variability in hemolytic resistance of red cells,⁴ it is necessary to retitrate this complement dilution each time a new batch of cells is used. If used in this manner, sodium acetate has no deleterious effect on the Wassermann reaction. Indeed, if anything, the reactions are clearer cut with its use. In the 12 per cent. acetate complement dilution, germ growth occurs when contaminated; but my experience has been that this does not affect the complementary activity. I have many times used such a complement cloudy with bacterial growth but with comparatively strong complement unit. Further the addition of 10 per cent. Sodium Acetate to Culture Media (Dextrose agar) did not inhibit the growth of Streptococci. It is obvious, therefore, that the action by which acetate preserves complement must be in some way a physicochemical phenomenon, that is, that complement enters into a loose combination with sodium acetate.

This opens a very interesting and fertile field for investigation as to the nature of this elusive labile substance called complement, and suggests the possibility that it is an enzyme with definite chemical composition. As to the property sodium acetate has, as I have found, of preventing coagulation and at the same time not destroying complement, it may be that it would be of more value in blood transfusion than sodium citrate, which does destroy complement. It would therefore be of value to determine its toxicity, the minimum amount necessary to prevent coagulation, and whether or not the presence of complement makes blood more suitable for transfusion.

CHRONICALLY ENLARGED SPLEEN (MALARIAL?)

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Mrs. B. T., aged 34, was one of fourteen children, ten of whom, five boys and five girls, lived to be grown. Three sisters and four brothers are now living. The father died of dysentery at the age of 68. The mother is still living, aged 68.

At the age of 10 years the patient had had a prolonged attack of fever, during which the spleen had become enlarged and dislocated downward. During this attack of fever, she had had severe constipation. Since the attack she has had many similar ones, each being accompanied by an enlargement of the spleen. Each time, after the subsidence of the temperature, the splenic enlargement decreased, but the tumor could always be felt in the hypochondrium. Ever since her first attack of fever, she has been obstinately constipated.

She was married at the age of 21, and is the mother of six children, three boys and three girls, all healthy and robust. Her husband has been dead a year. She has been in bad health her entire married life, being always worse, if not practically helpless, during her periods of gestation. During each pregnancy, she suffered severely with nausea, and pain in the left side of the abdomen.

Dr. VanNuys was called to see her, Nov. 5, 1911. The patient had been seized the night before with severe cramp-like pain in the abdomen, and diarrhea. From this time until December 7, the date of the operation, she had many attacks of severe pain in the abdomen, which were cramp-like in character, each attack leaving the abdomen increasingly tender. Her temperature ranged from 99.2 to 100.2 F. She persistently refused the advice of her physician, that an exploratory operation be performed.

During a lull between attacks, a bimanual examination was made by Drs. VanNuys and Bledsoe. This examination revealed the facts that all the pelvic landmarks were obliterated, and that the uterus was firmly fixed.

About December 1, she finally consented to an operation and was brought to Houston. On her entrance into the hospital her condition was very poor. After she had had a few days of rest, we felt justified in proceeding with the operation.

4. Rhamy, B. W.: Variations in Resistance of Blood Cells to Hemolysis, *THE JOURNAL A. M. A.*, Nov. 17, 1917, p. 1728.

2. Jour. Lab. and Clin. Med., 1917. (Reimann, Vol. 2, p. 200.) (The preservation of erythrocytes for the Wassermann reaction.)

3. Noguchi, Hideyo: A Method of Facilitating the Serum Diagnosis of Syphilis Under War Conditions, *THE JOURNAL A. M. A.*, April 27, 1918, p. 1252.

When the abdomen was opened a large reddish purple tumor mass was revealed, plastered over by many adhesions involving the omentum, intestine and pelvic organs. After the tumor mass had been freed from the surrounding viscera, something of its character and origin was determined. It had the appearance and physical characteristics of a cyst. A large trocar was thrust into the tumor, but the capsule was so friable that it split in many directions, allowing a thick reddish purple fluid to pour out. Further dissection revealed the fact that the tumor mass was the remains of a large spleen, the pedicle of which had become twisted, shutting off the circulation and resulting in moist gangrene of the organ.

The pedicle was ligated, as much of the tumor was removed as was possible, cigaret drainage was instituted, and the abdomen was closed. The patient's general condition was very bad when she left the table.

Microscopic examination of some of the less necrotic pieces of the tumor was made by Dr. Martha Wood, corroborating the operative diagnosis.

After three stormy days, the patient began to rally, and was able to leave the hospital and to return to her home for Christmas, although the wound continued to drain freely until January 30, since which time she has been perfectly well.

COMMENT

The location of the patient's home in a district of Texas, notorious at the time of her girlhood for the prevalence of malaria, in addition to the diagnosis of malaria given to the patient by the family physician who saw her during her first attack, leads us to the assumption that the primary enlargement of the spleen was malarial in origin.

An Error of the Wassermann Test.—A test that I have used has proved many negative results to be positive. I perform the Wassermann test exactly the same as the original test, using the four hour ice-box incubation. There is an adjustment in the use of the amboceptor. Some technicians employ twice the smallest degree of amboceptor used in the titration that produces hemolysis. Others employ as high as three and four times the smallest degree of amboceptor as a unit. Using a larger amount than the titration allows gives more negative results, some of which prove to be positive. I wish to emphasize the fact of using the smallest degree of amboceptor as a unit, along with twice the smallest degree as a unit. Cases that are negative with twice the smallest degree as a unit and are + + + + with the smallest degree as a unit should be recorded as + + + +, provided, of course, the test control and the known serum show complete hemolysis. Accordingly, any cases that show + +, + + + or + + + + are to be recorded as such. Doubtful reactions are to be excluded. My results have been very satisfactory. I have found many + + + + reactions that were reported to me as negative by reliable laboratories, and my results have proved to be correct. Once more I urge that the smallest degree of amboceptor as a unit be used with twice the smallest degree as a unit. Many well known technicians have stated that the reactions with the smallest degree of amboceptor as a unit have proved not to be "snappy." However, sometimes reactions occur that are too "snappy," which might prove to be positive if the smallest degree of amboceptor as a unit was used also. Many errors in diagnosis are made because of a false Wassermann report.—EMANUEL JACOBSON, Brooklyn.

Health Insurance.—Today, for example, we possess a mighty power to fight disease. To the wealthy class this scientific knowledge is available; to the poverty-stricken it is doled out in charity dispensaries. But for the masses of the working population—in the United States alone among the great industrial nations—such treatment is not available. Through a properly organized system of health insurance it would be possible to bring the world of medical science to the aid of the humblest wage earner.—John B. Andrews, *The Survey*.

Military Medicine and Surgery

THE EYES OF THE ARMY*

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When an ophthalmologist studies the new regulations for drafted and enlisted men, he is immediately confronted with the fact that men with low vision, which can be raised by glasses to the required standard in one eye, are enrolled for some form of limited military service, and at once the thought comes, How are these men to be supplied with glasses if they have none, and how are lost or broken glasses to be replaced here, and overseas?

The problems are more easily solved for this country than for abroad; but to obtain the best solution, the work here and there must be coordinated. In the early days following our country's entrance into the arena of world conflict, the Subcommittee on Ophthalmology of the General Medical Board of the Council of National Defense took up these problems, which then, owing to a higher standard of visual requirements, were less difficult than at present, and a plan was worked out for adopting a standard type of frame for all soldiers, and for the establishing of a small optical shop to be connected with a special hospital for surgery of the head to be sent overseas.

Various types of frames were experimented with and the following specifications finally adopted:

White metal, best stiff construction; 40 mm. round eye; special 0.055 inch full length cable temple $6\frac{1}{2}$ inches; split joint end piece; 0.072 eye wire.

Bridges assorted as follows: $8/12$ of N1 $\frac{1}{2}$ long shank; $3/12$ of N1 long shank; $1/12$ of N1 $\frac{1}{2}$ regular.

When the members of the subcommittee were commissioned in the Medical Reserve Corps, these plans were enlarged and modified to fit new conditions, and carried into effect by the ophthalmic department of the Division of Surgery of the Head in the Surgeon-General's Office.

Some of the ophthalmologists in this country have criticized the standard frames adopted, and with justice, for it would be impossible to select any type of frame that could not be criticized. The frame adopted, however, with its three variations of bridge, seemed to those studying this phase of the problem to present the fewest faults. The criticism was several times presented by ophthalmologists that the three types of bridge did not allow for enough variations; but before adopting such, a set of these frames was given to several first-class adjusting opticians, who quickly demonstrated that any fit likely to be called for could be obtained from one of the three bridges. It is true that the bridges are stiff, but this disadvantage is more than balanced by the fact that, once properly adjusted by the skilled mechanic, they are likely to remain in place. The criticism, however, most frequently sent in pertains to the round eye piece, and the disadvantage that the cylindric lenses may be turned in the frames. This complaint is best answered by calling attention to the fact that all cylindric lenses when in place will be marked in the side at a point close to the

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