The present status of blood substitutes for the navy.
Blood substitutes in the armed forces.
Drs. Newhouser and Kendrick.

Dr. C. R. Drew, Washington, D. C.:

With Dr. Taylor we have been collecting blood from donors and the rules for donors are as follows: They must be between twenty-one and sixty years of age. They must be in good health and must not have a history of having had syphilis, malaria, tuberculosis or heart disease. Specifically, each donor is asked concerning these conditions. They must not have a temperature at the time the blood is drawn of more than 99 degrees F. The reason for that is that in a series of tests it was found that those donors who had temperatures above normal at the time they gave their blood had something in their blood which caused a reaction in the recipient in every case. They must have a blood pressure of at least 100 systolic and a hemoglobin of at least eighty per cent. They must have a negative Kahn or Kline test and if there is a suspicion of a positive reaction in any of the more rapid tests, then it must be confirmed or ruled out by a Wassermann reaction before the blood is considered. Wherever the blood is at all suspicious it is thrown out, but from the legal standpoint and from the point of view of the donor, it is always checked with a Wassermann reaction. Those criteria have been followed very carefully throughout this work.

DR. DREW:

The question has been asked. What about food for donors? All donors are asked to fast for four hours before coming in. But may have tea without cream, fruit or tomato juices and a cracker. The purpose of

this is to secure plasma as clear as possible and free from fat.

DR. DREW:

The collection of blood is not only a scientific problem but also a complicated social matter too. The collection of blood for the British army in New York showed that. I should not like to see any such project try to make headway if the rumor were started that syphilitics were welcome. The problem of the Red Cross to get donors for these large projects, that is, to get a continuous supply of three hundred donors a day, day after day, is really quite a job. Any rumor which gets a start at all, even in a city as large as New York where rumors will not travel as quickly as in smaller cities, will show an immediate drop in the numbers of donors who will come in. Such a question came up last fall. The rumor was to the effect:- Where is the evidence that the plasma we are donating is really going to England? One can almost make a curve of the decline in donors when such a rumor gets around. I should hesitate to think of the curve of supply of donors should word be passed that the army and navy were being sent syphilitic plasma. Technically, there are grounds for believing that the chance inclusion of the blood of a person is without danger to the recipients of pooled dry plasma.

Concerning the other question, there is no distinction made concerning race.

DR. DREW:

There is no restriction on hypertensives unless they happen to be polycythemic hypertensives. Such restriction is made for two reasons. In the first place, the amount of plasma one obtains from such donors is hardly worth all the effort it takes to get it. Secondly, one may

get into trouble with private physicians who bleed these patients every two weeks or so, who lose these patients when word gets around that free bleeding may be obtained at the Red Cross Blood Bank.

DR. DREW:-

Under the present set up it is not necessary to know about the blood group of the donor. It is, however, taken and the typing done in order to tell the donor what his type is. In the process of pooling of plasma or serum it really does not make any difference. The type is given to the donor simply as a courtesy to him.

The storage, transportion and administration of whole blood. Dr. DeGowin.

DR. C. R. DREW, WASHINGTON, D. C.:

I would like to comment on some work done at the Presbyterian Hospital on the collection and storage of blood. First, if blood were shipped for the use of the army and navy in this very dilute solution large amounts would be required. Secondly, lyophilization with this amount of glucose present is difficult. Even without lyophilization there are certain disadvantages. One is that it requires 2000 c.c. of blood to raise the plasma protein one gram per cent. If the blood is being given for the treatment of shock, one of the indices one can follow is the plasma protein and in a series of some one hundred cases it required 2000 c.c. of blood to raise the plasma protein one gram per cent. If we had a solution as dilute as this solution, we would just about have to double the amount of blood given in order to get an equal result. Also, with the dilution factor, these quantities might be even greater. That is a very decided disadvantage.

The next point I want to make is in reference to the statement of Dr. Taylor that we are sending the blood now from New York to Philadelphia with simply fifty c.c. of 5% citrate in it. I think it should be brought to mind that there is some danger of more rapid hemolysis if the blood is shipped after twenty-four hours. There is a very definite rate at which the cells break down. In the earlier stages it is not very rapid but the older the blood is, the more rapid is this breakdown of the cells. I would like to ask Dr. DeGowin, having transfused patients with this very dilute solution, when blood is very old, that is, ten or twenty or thirty days old, how is the increase in red blood cells maintained? I ask this specifically because we found that after blood is seven days old, there is a loss, in the height of the red blood cell count in a few days. Whereas when blood less than seven days old is used one gets the same sustained increment of rise in the R.B.C. and hemoglobin, as with fresh blood. The body seems to treat these older cells as what they really are, old red blood cells, and they are rapidly taken out of circulation.

Bacteriological control of the various stages in preparation of plasma and serum. Johnson and Meleney.

DR. C. R. DREW, Washington, D.C.:

I would like to say that Dr. Novak has made available to us in New York both of his reprints and this information which he has brought today and we have considered it very seriously. We asked Dr. Doches who has had many years of experience in bacteriological work to check this work. In the first series he and his associates Dr. Heath and Dr. Province did not get such happy results. This is all being checked again at the present time but in the final results with the sulphanilamide group, the results have not been good, or not as good as Dr. Novak reported. However, that will be reported at greater length later.

One of these substances may be of real value but I cannot help but say that in collection of these very large quantities of blood, the antiseptics as a whole have been very disappointing and that one must stress over and over again the importance of the sterile technique, because one runs into grief over and over in depending upon the bacteriostatic properties of any drug to cover up for poor technique.