cipient's blood grouping. In an extreme emergency this eliminates the necessity of knowing a prospective recipient's blood grouping if a plasma transfusion is needed in a great hurry. . . . As experimental and clinical data continue to be presented to the profession, we shall become convinced of its value in specifically indicated cases. It would be a considerable contribution to medical science if quantities of blood were given voluntarily to provide material to carry on this work." 2 references.

J. C. M. C.

HUBBARD, M. E.: *Discussion of Blood and Plasma Transfusions.* Mil. Surgeon **88**: 125–128 (Feb.) 1941.

"The current use of preserved human blood for transfusion has been especially motivated by economic pressure in the United States and by military necessities in Europe. . . . Let us consider the advantages of using blood plasma as compared to whole blood, or 'banked blood.' Using whole blood, there is typing, serological examinations, and cross matching that has to be done; whereas, in plasma, or serum, this is unnecessary due to the laws governing hemo-agglutinations—that opposite sera neutralize each other's agglutinins. Also, consider that the blood pools have at least 35 donors and the plasma, or serum, derived from this pool tends to neutralize one another in vitro, and that in vivo the reaction is accompanied by an absorption of agglutinin by the recipient's tissue. Larger pools would be present in wartime and the agglutination titer would be lower. . . . Dried blood plasma has been used in America and England. It contains all the characteristics of original blood plasma. . . .

"We have between eighty and ninety Veterans' Administration hospitals located in strategic points. These hospitals, with the Army and the Navy hospitals, could be used as blood plasma and serum centers. The administrator and the medical director of the Veterans' Administration hospitals have insisted on high standards and modern equipment, and our hospital in Los Angeles at the present time could assume the duties of making blood plasma and serum, if necessary. The value of preserved bank blood and blood plasma cannot be challenged. Its use in war and peacetime will save many lives and will advance our standard of medicine."

J. C. M. C.

SILVERMAN, D. N., AND KATZ, R. A.: *Plasma Transfusion (Part 1).* Internat. M. Digest **38**: 59–63 (Jan.) 1941.

"At present there are two types of plasma being used, the wet and the dry. Wet plasma is defined as the liquid plasma separated from unclotted blood, and is either modified or diluted with saline or glucose. By dry plasma is meant plasma which has been subjected to various drying procedures and finally put up as a powder for ultimate regeneration with distilled water when needed.

"Wet plasma is prepared at relatively low cost, not requiring expensive apparatus. It is easily dispensed from the same storage bottle, insuring maximum aseptic safety. Another factor of importance is the speed with which it can be made available, as contrasted with dried plasma which must be regenerated with distilled water. Particularly is this of importance in military practice, where swiftly moving mobile units make it necessary to discard procedures which may prove cumbersome.

"The dried plasma has its principle virtue in being concentrated into a very small space, being kept indefinitely in hermetically sealed ampules. But, as has been observed, it is still neces-

sary to carry along distilled water to redissolve the concentrate. However, when dried plasma can be prepared in large quantities cheaply, it will be desirable because of its keeping qualities and its economy in storage space.

"*Preparation.*—Plasma is prepared today by three methods; namely, sedimentation, centrifugation, and desiccation.

"We are using the sedimentation method for our plasma preparation. Whole blood is citrated in a new type 500 cc. vacuum bottle, which contains 70 cc. of 2½ per cent sodium citrate. When the blood is collected the bottle is placed on a level surface in the refrigerator where the temperature is maintained at 4 C. We aspirate plasma after a minimum of twenty-four to a maximum of one hundred twenty hours.

"Collection and storage of plasma is accomplished by transferring the sedimented blood to a table without agitation. A vacuum flask without citrate is used to receive the supernatant fluid.

"Our aspiration set consists of a 30 cc. Luer Lok syringe fitted with a three-way petcock attached to two rubber tubes. To one tube is fitted a glass tube and to the other a large gage needle. The vacuum in the blood bottle is next released by inserting a needle through the same spot used originally to collect the blood. A hole is punched in the seal over the free hole—not over the airway.

"The glass tube (aspiration) is gently forced through the hole into the plasma layer, and the petcock is adjusted for aspiration; the large needle (delivery) is forced into the empty plasma bottle.

"The advantage of this apparatus is that it is possible to watch for any red blood cells ascending the glass tube, and when they appear, to terminate the aspiration.

"The method of centrifugation is most widely used in the large centres that have adequate facilities for handling large centrifuge bottles, usually 250 to 300 cc. each.

"Elliott, Busby, and Tatum . . . have laid down for the preparation of clear dilute centrifuged plasma the following rules: 1. The use of fasting donors, 2. storage of whole blood more than twenty-four hours before being converted into plasma, 3. avoidance of shaking whole blood before it is transferred to centrifuge bottles, 4. refrigeration for approximately twelve hours to permit sedimentation of red blood cells not removed by the centrifuge, 5. the addition of diluent containing glucose, 6. the addition of merthiolate in a concentration of 1:10,000. The average yield of plasma by this method is from 50 per cent to 55 per cent, while that obtained by sedimentation is 40 per cent to 45 per cent.

". . . The method of preparation (of dried plasma) calls for very complicated equipment and is of necessity a very expensive procedure.

"The value of lyophiled plasma resides in the fact that it may be regenerated to its original volume or to as much as one-fifth of its volume, thereby producing a very concentrated plasma.

"*Administration.*—A double transfusion set with a stainless steel filter is used to administer the plasma. We run in 5 per cent dextrose in either saline or distilled water depending on the case treated. There are times when the maximum effect of the undiluted plasma is wanted and in these cases no admixture with fluid is made. The volume of plasma used usually ranges from 200 to 600 cc. of undiluted preparation. However, much larger amounts have been used without any untoward effect. The rate of flow is usually about 4 to 5 cc. per minute, although twice that amount may be given with perfect impunity. Plasma should never be warmed and can be given

safely from temperatures ranging from that of the refrigerator to that of the room.

"Besides the intramuscular route plasma may be efficiently given both as a hypodermoclysis and intramuscularly. We have given the fluid subcutaneously without any untoward effects. The rate of absorption is an individual matter, but roughly it approximates that of physiological saline. . . . Plasma is absorbed effectively from the extravascular spaces. . . . The rate of utilization is more efficient if given by the intramuscular route than by the subcutaneous route. . . . The extravascular mode of administration does give the patient some discomfort. . . . The pediatrician has found that the intramuscular administration of plasma is a very satisfactory way of supplying and augmenting fluid and protein.

"*The Question of Incompatibility.*— We are using pooled incompatible plasma exclusively in our work. Blood donors are typed and their group recorded on the blood bottle, as is also their Kline reaction. This is done only to facilitate pooling, for we have not, except in rare occasions, given type-specific plasma. . . . We have repeatedly run titrations on our pooled plasma and have invariably found very low agglutinin titres.

"*Source.*— We believe plasma should be obtained primarily from blood drawn for the express purpose of plasma preparation. Plasma obtained from over-aged blood may be dangerous because of the heightened potassium content. There is no blood bank in conjunction with our plasma bank."

A. W. F.

HOWKINS, JOHN: *The Value of Placental Blood for Transfusion.* M. Press **205**: 46–48 (Jan. 15) 1941.

"In 1938 Goodall, Anderson, Altimas and McPhail described their technic of collection and storage of placental blood, and subsequent writers have, with slight modifications, followed their description. . . . A number of points must now be discussed. First, the question of what effect, if any, the withdrawal of the placental blood has upon the mother. There is only one possibility that the withdrawal of fluid from the engorged placenta might delay its separation and thus lead to a prolongation of the third stage, or worse, to the retention of the afterbirth in the uterus. Almost all workers are agreed that this is not so. . . . The second question is the effect on the baby of cutting off what has been considered by some to be a vital oxygen-carrying content of blood. Page, Seager and Ward regard the placenta as a mere diverticulum of the foetal circulation. . . . These workers, . . . offer convincing proof for their theory by performing serial blood counts on a number of babies whose placentae had supplied blood for transfusion, controlled by a series in which the cord was left attached after delivery. . . . If we accept this work, and there is no reason why we should not, the disadvantages of robbing the newborn of his birthright of placental blood are seen to be non-existent.

"The most important point of criticism that has yet been raised against the use of placental blood for transfusion is its sterility, and it is on this count that Howkins and Brewer have rejected it. . . . Barton and Hearne, 1939, culture every specimen to be on the safe side, and this is undoubtedly the only satisfactory method of ensuring sterility. The length of storage after which it is inadvisable to use the blood varies with different workers. Barton and Hearne discard all blood that is over 21 days old, and since doing this they have reduced their reaction rate very considerably. Gwynn and Alsever have successfully adminis-