The wartime situation in 1939 led to a demand for plasma supplies to treat military and civilian casualties. Dried plasma was especially in need for use in the tropics, where it could be stored effectively without deterioration. The Medical Research Council established a Blood Drying Unit in the basement of the Department of Zoology building, which prepared and distributed 2,500 bottles of dried plasma each week.

This plasma, or another blood derivative called serum, was blood from which the red corpuscles had been separated. Both plasma and serum tend to deteriorate with age or in transport. To meet war-time needs they had to be dried. Under ordinary circumstances evaporation involves heating but as this would coagulate the proteins in the blood and spoil them, plasma and serum had to be dried from the frozen state if they were to remain unharmed.



Plasma travel best in crude unfiltered state. Laboratory workers unpacking plasma from the Emergency Blood Banks, pooled in large bottles to neutralise the different blood groups, and shaken up with Kaolin to prevent clotting. These bottles are sent to the Drying Unit in metal crates by passenger train.



A sterility test is made on each bottle of crude plasma, when it arrives at the Unit, before it is filtered. Contaminated material is rare. Each depot receives a report so that they can trace any contaminated bottles to their source, by means of the numbers attached to them.

One cubic centimetre of plasma is added to four cubic centimetres of melted mediums in a tube, which is then rotated in cold water, to sit the medium in a thin layer on the walls of the tube. Culture tubes, inverted in a wire basket are put in an incubator. If any bacteria are present they multiply in the medium, become visible as small dots, which can be counted. Result is given as number of bacteria in each cubic centimetre of plasma.





The crude plasma is syphoned off the Kaolin deposit with which it has been shaken up to prevent clotting, and mixed in large flasks. Operator wears mask and gown to prevent dust and germs from entering the bottles.



After passing a sterility test, the crude plasma that arrives at the Unit is clarified by being passed through a thick layer of paper pulp. Here a laboratory worker is preparing the paper pulp filter.



Sterile, filtered plasma, in reservoir at top of bottle-filling apparatus, is drawn off into standard transfusion bottles in accurate quantities of 400 cubic centimetres. Before filling, the mouth of bottle is flamed to destroy any bacteria. Glass hood prevents germs from entering whilst the bottle is filled.



In the Spin-Freezing room. A laboratory worker, dressed in flying kit and gloves as a protection against the extreme cold, loads the spinning machine. Frozen bottles of plasma from the previous run are being replaced with unfrozen bottles.



When bottles of plasma or serum have been frozen in the Spin-Freezing machine, they are transferred to the cold storage room, kept at a temperature of 25° Centigrade, till placed in the vacuum drying chamber. This laboratory worker wears flying kit and gloves as a protection against the intense cold.



Bottles of plasma or serum, frozen in the Spin-Freezing machine, are loaded into the head of a vacuum drying chamber. Each head holds 180 bottles. One bottle is used as a check on temperature of plasma throughout the drying process. It is connected to the coiled wire seen in the centre of the photograph.





After 3 days in the vacuum drying chamber, a trace of moisture still remains in the bottles of plasma. Bottles are at this point removed to secondary vacuum chambers for 2 more days. In this case, drying agent is Phosphorus Pentoxide, a white powder with the power of absorbing the smallest trace of moisture.

After 5 days in two vacuum drying chambers, the bottles of completely dry plasma are removed and their gauze drying caps replaced by a metal screw cap and rubber washer. This cap has a small hole through which a hypodermic needle is passed. Neck of the bottle is flamed during replacement of cap to destroy germs.



Bottles of dried plasma, removed from the vacuum drying chambers to be fitted with metal screw caps, through which pass hypodermic needles, are returned to chambers for completion of the drying process. Capping is carried out in small cabinet, bottles passed through doubledoored hatch, to exclude draughts of dust laden air from main laboratory.