lytic disease of the newborn, and indications for transfusion in the newborn. The criteria for anaemia in the neonatal period and the indications for transfusion are amongst the best sections of the book, and the technique of transfusion in the newborn describes in detail the use of the umbilical vein, the scalp veins, and the saphenous vein.

The whole book shows a mastery of the subject, and for the first time collects into one volume the wider as well as the more detailed aspects of transfusion techniques. It is a book which should be read by the clinician, who will probably skip many of the mathematical data, but will gather an idea of the difficulties of the laboratory worker; and should certainly be read by every practising pathologist who has to control blood collection, storage, or transfusion. It is easy to prophesy that this will become a standard textbook in British hospitals.

One or two minor criticisms are mainly of faulty proof-reading, and in some parts the author is difficult to follow in the concentrated discussions. These do not detract from the overall ease of following the author's meaning, particularly in the technical sections.

A. GORDON SIGNY.

Observations on the General Effects of Injury in Man. (With Special Reference to Wound Shock.) By R. T. Grant and E. B. Reeve. 1951. Special Report Series No. 227. London: His Majesty's Stationery Office. Pp. xiii 313. Price 8s. 6d.

This special report is based on the investigations made during the last war on 230 cases of injury to the limbs and on 80 cases of injury to the abdomen. The patients were drawn from the home front and the Italian campaign. The investigations were confined to injury in two parts of the body, the limbs and the abdomen,

and so the authors, with admirable discretion, have set out to examine in detail a limited problem. The report is also enhanced by the fact that the cases were studied from the time of admission to hospital until recovery seemed assured or until death. In this respect this report would seem to be unique.

Throughout these investigations special attention was paid to the study of the circulation and to four factors in particular, blood pressure, pulse rate, skin temperature of the extremities, and colour of the face, and the clinical condition was assessed by these simple bedside methods. The blood volume was measured on 71 cases of the Italian series, but was not used in the study of the casualties on the home front.

This report again emphasizes that the central feature in shock is the fall in blood volume. The amount of this fall can be reasonably accurately assessed by a study of blood pressure and of the size of the wound. A method is described of estimating the wound size in terms of the size of the hand and will be found to be one of great value in everyday work in the casualty ward.

The main cause of the fall in blood volume is haemorrhage, and so in treatment one must concentrate on intravenous transfusion of blood, plasma, or serum. These substances must be given in sufficient quantity, sufficiently early, and at a sufficiently rapid rate to restore blood volume at the earliest possible moment, and this appears to be the main practical lesson to be learnt from this report. Gone are the days when the patient was allowed to lie for several hours to recover sufficiently for operation to begin.

Due credit is given to the work of investigators in the first world war, especially to Keith, who was the first to show by measuring the blood volume (vital red method) that wound shock is considerably associated with a reduced blood volume and that the degree of reduction bears a definite relationship to the severity of the patient's clinical condition. Grant and

Reeve find no evidence of a toxic origin of shock and the nervous stimuli are only a secondary factor. Haemorrhage is the essential cause of the fall in blood volume, and where cases do not respond to transfusion then the blood volume has either not been restored at all or not restored quickly enough. This is true in the main, though it is admitted (Case B 60) that in some cases other factors operate. Having cleared the ground of much that is obsolete, the report introduces two other factors which play a part in the shock syndrome, fat embolism and disorder of mineral metabolism. The authors believe that fat embolism plays a part, how large they are not quite sure, in the clinical course of the shocked patient, though they are quite sure it is not a major factor in the production of shock. This is probably the most controversial part of the report. It may come as a surprise to those who are not conversant with the literature in this field that these workers found that perhaps 20% of those dying of abdominal wounds might have been saved and the clinical course of those who recovered made easier if salt and fluid had been given.

The final part of the report discusses the more technical aspect of the work on blood volume measurements and haematological and biochemical changes associated with injury. This section is wholly admirable. The methods of estimating blood volume using the dye T1824 are analysed and their application to the estimation of haemorrhage outlined; the volume of transfusion required to restore blood volume is discussed in detail. It is refreshing to find that the simple haemoglobin estimation can be of value in the estimation of blood loss, and the field worker is once again indebted to these practical workers. Many workers, especially Moon, have stated that haemoconcentration is an essential part of shock. Grant and Reeve found that this is not true; in fact haemodilution occurs in most cases. In the case of limb injuries after blood loss there is a fairly rapid dilution of the blood first with fluid poor in protein, but later and chiefly with fluid

containing protein in nearly the same concentration as the original plasma. In abdominal injuries with penetrating intestinal wounds haemoconcentration may occur after the first 12 hours due to dehydration.

If any criticism can be made of this carefully documented report by two such famous investigators it would be that in some cases the necropsy reports are not very complete; the histological findings especially could have been a little more detailed. For instance, it would have been of value to have known more of the histological examination of the brick red lungs of the most interesting case, I 5, as surely the possibility of blast injury arises. In fact one is struck throughout the whole report by the fact that little or no consideration has been given to the possibility of blast lesion. Again no attempt appears to have been made to examine the urine or sputum for fat droplets during life, and no mention is made of the examination of the fresh lung for fat emboli, a method found to be of great use by other workers.

It is an indication of the rapid way in which work in this field is progressing in that since the work was completed the lesson of speed in transfusion has been carried to the stage when intra-arterial transfusions are now given, the type of fluid which can be given has been increased by synthetic substances, and the study of sodium metabolism has been shown to be at times less important than derangement of the potassium ion. However, this is a report which must be read by all those interested in the treatment of the injured patients and will not only serve as a record of careful work but will, like all good research, no doubt act as a guide to all future workers in this field.

The bibliography is helpful and reasonably complete, though, with the emphasis laid on fat embolism throughout the work, one would have expected a little more consideration given to the work of others on this subject.

J. V. WILSON.