essential points in this cardiac infection may be summarized as follows:

1. There is a great resistance by the tissues to the infection.
2. The general toxæmia varies greatly in different cases.
3. The tendency is to multiple focal lesions.

4. Hyperæmia with increased permeability or fragility of the blood capillaries is frequent.
5. There are swelling of connective tissue, cell proliferation, leucocytic infiltration, and necrosis.
6. Scar formation and adhesion follow necrosis.
7. Exudations vary in character with the virulence and nature of the surface involved.

THE USE OF A DIVIDED MATTRESS AND PELVIC ELEVATOR.

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WHEN we have so many seriously injured men as at present the following adjuncts to our surgical technique may be useful.

There are two simple contrivances which, on suitable occasions, if used together, or separately, will contribute to the comfort of the patients, to the ease of the nurse,

FIG. 1.—Mattress in four pieces.

and will facilitate the work of the surgeon. These are—(1) a mattress divided into four pieces, and (2) a pelvic elevator. They are of use for fractures of the lower limbs, excision of joints, in paraplegias, sacral bedsores, dressing of pelvic wounds, etc.

When fractures are plated the same necessity for rigid fixation of the parts above and below the fracture does not exist; but even here the comfort of the patient will be increased by the use of a divided mattress and elevator.

In cases of fracture of the femur where it is of importance to maintain the fractured bones in rigid apposition, elevation of the patient for cleansing of the back and pelvis and the introduction of the bedpan are seriously disturbing. This is especially so when treating patients placed on ordinary mattresses, as the pelvis has to be raised and lowered on each occasion, and consequently the fractured fragments, when not plated, are apt to be displaced.

DIVIDED MATTRESS.

For the purpose of keeping the pelvis on the same level with the femur a mattress is arranged divided into four pieces, an upper portion measuring 28 in. in length, a lower piece 34 in. in length, and two centre pieces, each measuring 12 in. in length, with a handle at each end (Fig. 1). (The two latter portions may be made in one piece, but this makes a long part, the breadth of the bed,

not so easily handled). The length of top and bottom pieces may vary according to the height of the patient to be provided for.

FIG. 2.—Pelvic elevator.

Quotation from Ward Sister.

"When preparing this mattress for a patient each of the two larger mattress pieces is covered with a separate sheet, and the small portions placed in position uncovered between the two larger ones. The binder, mackintosh, and draw sheet are then placed across the bed to cover the small portions of mattress, and the ends of the sheet, etc., are tucked in on either side underneath the mattress

as in an ordinary bed. When the bedpan is about to be introduced these two centre pieces are withdrawn, one from either side, and the under sheet adjusted."

The pelvis, however, is apt to sink somewhat when the supporting middle pieces are withdrawn, though a skillful nurse can prevent this. In order to prevent this sinking a pelvic elevator is used.

THE PELVIC ELEVATOR.

The pelvic elevator consists of two strong wire uprights,

which form a frame joined at the top by a piece of metal through which a screw passes supporting a cross piece, to which is attached a pelvic band (see Fig. 2).

When in use this elevator is put across the patient at the level of the pelvis, and, when it is used along with a cut mattress, one limb of the elevator rests on the lower segment of the mattress and the other limb on the upper. When not in use the pelvic band is detached and may be left *in situ*, lying flat under the patient.

When required, the pelvic band is attached to the cross bar of the elevator and the screw revolved until the desired

FIG. 3.—Pelvic elevator in position—the weight being now on pelvic band—preparatory to withdrawal of centre pieces of mattress.

elevation of the pelvis is attained (Fig. 3). The weight of the pelvis is transferred to the pelvic band sufficiently to enable the middle portions of the mattress to be withdrawn without disturbing the pelvis. The sacrum may then be washed or the bedpan introduced without movement of the pelvis, and, consequently, without disturbing its relations with the femur. The elevator is so arranged that it may be wrought by the nurse or by the patient. The latter may assist himself while lying supine by elevating or lowering his pelvis, and so adjust the level to suit his convenience (Fig. 4).

Do not overdo the elevation of the pelvis, as an over-enthusiastic nurse might do; just elevate sufficiently to suit.

Such pelvic elevators may be used for many other purposes: For elevating the pelvis during the application of bandages or surgical dressings; washing and cleansing the patient; for the prevention of bedsores and for the dressing of them when they have occurred; for fracture dislocation of spine, paraplegia, and for bedridden persons who have few attendants, especially as many of the patients could thereby assist themselves by working the elevator to any desired extent. The pain or aching in the back so often complained of during the first days after operation, when patients are compelled to lie supine, can be greatly relieved by the pelvic elevator, which can be adjusted and readjusted, raised and lowered as often as required.

It may also be employed as an elevator for any

FIG. 4.—Pelvic elevator sustaining weight of patient: centre piece of mattress withdrawn.

other part of the body, and, with the addition of extra slings, may act as a support for an arm or a leg. When not in use it may be employed as a cage for keeping the weight of the bedclothes from a fractured limb, or as a fracture cradle.

The divided mattress, as illustrated, was introduced by me in the early seventies for patients who had femoral osteotomies performed on them on both limbs at one time, and in whom it was necessary to main-

tain the limbs rigidly in proper relation with the pelvis until ossification was completed. Since then it has been in use for patients with fractures of the femur, and for other injuries and ailments. It has been found of much convenience to the nurse and comfort to the patient.

The pelvic elevator in one form or other has been used by me for a considerable period, but the newer, lighter forms here depicted have been introduced of recent years. One of these, made of wood in forty-eight hours by the mechanic at Mount Stuart Hos-

pital, Bute, has served its purpose very well.

Desiring, however, to get an efficient and cheap mechanism, stout iron rod was used, the superstructure being made of a single rod bent as illustrated, with a joining plate at the top, where the arches meet, through which the elevating screw goes.

Mr. Hilliard carried out the instruction, and, as shown in Fig. 2, he has introduced a modification which occurred to him, and which allows of the collapse of the mechanism for carriage to a distance.

Further Observations

ON

THE HAEMAGGLUTININ REACTION,

WITH SPECIAL REFERENCE TO THE OPERATION OF
BLOOD TRANSFUSION AND TO NEPHRITIS.

BY

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In the *BRITISH MEDICAL JOURNAL* of December 8th, 1917, I drew attention to the use of the haemagglutinin reaction as a method of testing the toxicity of different antiseptic reagents to human blood serum.

A further study of the haemagglutinin content of the blood serum in a series of 250 patients when tested with my own washed red corpuscles and those of the sheep has shown:

I.

That different human serums vary very much in their haemagglutinin content when tested with the same standard red cells. This grading of haemagglutinative capacity is independent of the specific power of different serums to agglutinate the red cells of different individuals according as they fall in one or other of the established groups. Individuals whose serums belong to the same agglutinative group differ in haemagglutinative capacity. Some have a very low and some a high capacity for agglutinating the same washed red cells. The result of the serum test has been recorded on the same plan in all cases; thus +++ indicates a high, ++ a moderate,

and + a slight degree of haemagglutinin effect, while -- indicates the absence of any reaction. In all cases the macroscopic method was used (see *BRITISH MEDICAL JOURNAL*, December 8th, 1917).

This means, of course, that incompatibility of donorship in the operation of blood transfusion is also a graded character, and it is therefore desirable, when testing incompatibility, to express not only the presence but the degree of agglutinative reaction. I have also previously shown that 1 part of non-agglutinative to 4 parts of agglutinative serum is sufficient to neutralize haemagglutination *in vitro*, but before applying this fact to the human subject it is desirable to ascertain by experiment on animals whether the same holds good in the living body. But this grading of agglutinative capacity is also important from the biological point of view.

It is supposed that the familial incidence of a haemagglutinative capacity of blood serum in parents and children follows Mendelian laws. It is, however, evident that a character—for example, haemagglutinin content—which varies from zero to a high positivity is much more difficult to handle as a method of testing inheritance than a sharply defined character of more constant value.

II.

But not only does the specific haemagglutinative capacity vary in degree in different serums, it also varies from time to time in the serum of the same patient. This fact is even more important than the first. I mentioned in my earlier communication that there were reasons for thinking that a non-agglutinative serum may become agglutinative in a patient who has passed successfully through a systemic infection. As the result of a study of 140 patients whose serums have been tested against my own red cells before