The stage of collapse thus resembles the condition present after a severe hemorrhage, or in surgical shock.

This striking absence of all ordinary signs of heart muscle failure has made investigators question whether, after all, the heart is really involved in the circulatory failure. Romberg and several of his pupils in the Leipsig clinic, notably Pässler have recently investigated this problem very carefully and have published their results in a series of papers. At the outset they studied the mode of death in animals inoculated with one of the following infections; the pneumococcus, the bacillus pyocyaneus and the bacillus diphtheriae, and found that death occurred after rapidly developing symptoms of collapse similar in every way to the so-called heart failure in man.

They then repeated the inoculations in a large number of fresh animals and observed the blood pressure at short intervals. They found that it remained normal during the major part of the illness, only beginning to fall when collapse was impending.

Blood pressure, as we know, is dependant upon four separate factors, which may vary independently of one another:—

1st. The energy of the heart. 2nd. The peripheral resistance. 3rd. The elasticity of the arterial walls. 4th. The volume of the circulating blood.

The last two have little interest for us at the moment. The tone of the vessels regulating to a great extent the peripheral resistance depends upon impulses from the vaso-motor centres. Experiments show conclusively that this vaso-motor tone is an absolute necessity for the maintenance of the circulation, not only in the arteries, but also in the veins. Any grave injury to the vaso-motor center is followed by stagnation of the blood in the veins, and eventual heart failure because no blood is returned to it. To determine what factor was the cause of the great fall in blood pressure, Romberg and Pässler tried the effect of four procedures on their infected animals.

1st. Abdominal massage, which increases the work of the heart by emptying the abdominal veins into the right ventricle.

2nd. Temporary compression of the descending aorta above the diaphragm, calling for a maximum effort of the heart by greatly increasing the peripheral resistance.

3rd. Faradic stimulation of the nasal and anal mucosa producing extreme reflex vaso-constriction, if the medullary vaso-motor centre is intact.

4th. Transitory compression of the trachea producing asphyxia which stimulates strongly both medullary and spinal centers.