

symptom in the following pathological conditions :

1. *Fevers*.—In typhus, although the pulse, as a rule, ranges from 100 to 120, a slow pulse is not infrequently observed. Murchison reports cases in which the pulse was 28 to 40. In such cases there is usually very great prostration, and the heart may be seriously affected by pathological changes which are common in this disease. In convalescence a slow pulse is very often present. It is well to bear in mind that in adynamic conditions the pulse-beat does not always correspond to every ventricular contraction. Often a pulse-beat at the wrist occurs only after two or three contractions of the ventricle have taken place.

In relapsing fever, although the frequency of the pulse is very great in the pyretic periods, yet in the intervals, it is much diminished in rate.

"In the first half of the apyretic stage, however, the pulse usually continues a little above the normal standard, but for some days before the relapse, when the temperature has regained its normal height, the pulse is in many cases irregularly slow—often not exceeding 40 to 50; but assuming the erect position will sometimes raise it from 50 to upward of 100. The slow pulse is not due to slowness in the contraction of the heart, but to a prolongation of the pause."

2. *Diseases of Heart and Lungs*.—In attacks of syncope the pulse may fall to 20, and even lower, and continue at this rate for some minutes. In the early stages of endo and peri-carditis a pulse of diminished frequency is sometimes observed. In most congenital affections of the heart, and particularly in the *morbis ceruleus* a slow pulse is present. In fatty degeneration of the heart and in stenosis of the aortic orifice, the diminution in the rate of pulse becomes a sign of some importance in diagnosis and prognosis. In aortic stenosis the pulse is seldom lower than 50, and is small and incompressible. In fatty degeneration or Quain's disease it may fall as low as 30, or even 20, and a pulse of 10, with continuance of life has been observed. The pulse is small, gaseous, easily compressible. A slow pulse, with epiletiform seizures, has also

been observed in cases in which fibrinous masses were found affixed to the walls of the ventricular cavity after death. Permanent slow pulse has likewise been observed to follow attacks of diphtheria, and the explanation offered for this has been the frequent occurrence of fibrinous masses in the heart, which become attached to the walls of the heart. Charcot, however, has suggested that in such cases some lesion of the medulla or cervical cord may be present.

In pleurisy, with abundant effusion, after the crisis of croupous pneumonia, in the early stages of gangrene of the lung, a slow pulse is often encountered. In all diseases of the air-passages, or of the lungs, in which carbolic acid poisoning occurs, the pulse at first is slow, by reason of irritation of the vagus roots by this poison, but later the pulse becomes very much increased in frequency, from paralysis of the vagus roots by the increase of the poison in the blood. In pulmonary tuberculosis a rather frequent pulse is the rule, but sometimes the pulse diminishes in frequency, and Traube states that this is a sign of bad import.

3. *Affections of the Nervous System*.—In the first stages of cerebral hæmorrhage and cerebral compression a slow pulse is of frequent occurrence, and may also be present throughout the attack, but, usually, and especially when death is imminent, the rapid pulse succeeds.

In what is usually termed the second stage of almost all of the varieties of meningitis, the pulse is apt to be slow. Niemeyer and Traube assert that if in the course of any disease with head-symptoms, the pulse should fall from a high rate, as 110 or 120 to 50, 60, or 70, suspicion should at once be directed strongly to the occurrence of a meningitis. The diminished frequency is most marked in basal and especially in basilar meningitis, in which latter affection it may be 40, or less. In fractures of the cervical vertebræ, a slow pulse is common. Mr. Hutchinson reports a case of fracture of the fifth and sixth cervical vertebræ, in which a regular pulse of 48 was observed. According to Gurlt, the pulse may fall as low as 36, and even to 20. Fractures of the first dorsal vertebra seem to be accompanied for a time also by this slowness of the pulse. The