

arterial pressure which may be increased 30 or 40 percent. Moreover, in cases of persistent high blood pressure it can enlarge in order to handle the extra work involved.

The wonderful mechanism by which the blood vessels can be dilated in any part of the body that needs more blood, and constricted in any part that can spare some of its blood, is controlled by the vasomotor apparatus. This mechanism is of vital concern to the safety of the organism, and is guarded by a whole series of safety devices.

The control center of the vasomotor apparatus is in the medulla oblongata, the region of the brain just above the spinal cord. If that center is injured or destroyed, near-by subsidiary centers take charge. If they, too, drop out, ganglia of the sympathetic nervous system assume control. Finally, as a last resort when all central control has been put out of commission, the walls of the blood vessels themselves attend to the proper adaptation of the capacity of the vessels to the blood within them.

*Factors of Safety in the Elimination of Kidney Wastes.* The work of the kidneys is another vital body function. And here, as a margin of safety, we do have two organs, whereas one could perfectly well do the work required. Every medical man knows that one kidney can be removed if the other one is uninjured, and the amount and composition of the urinary secretion remains practically unaltered. Indeed, two thirds of the kidney substance can be put out of commission before there is serious impairment of kidney function. It has been pointed out that under ordinary circumstances large numbers of the million nephrons (functional units) in each kidney are not working. This luxurious surplus makes it possible for some of us to go on for many years after degenerative changes have begun to rob the kidneys gradually of nephrons here and there, without having our pleasure in life destroyed or our activities hampered.

*The Margin of Safety in the Respiratory System.* We have two lungs but we can get along fairly well with one. This is proved by the fact that a tuberculous lung may be completely immobilized by artificial pneumothorax in order to give it a chance to heal, and the patient suffers little inconvenience. Also, in some cases of pneumonia, the lung on one side may become solid without dangerously interfering with the oxygen supply of the body and the elimination of carbon dioxide.

*Factors of Safety in the Endocrine System.* In other paired organs we find an even greater margin of safety than in the lungs and kidneys. The cortex of the adrenal glands, of which we have two, is absolutely essential to life. Complete removal of both glands results in death in 36 hours. But if the tiniest bit of cortex is left—one tenth, to be exact—the business of the body goes on as usual. Complete absence or extreme deficiency of the thyroid at birth or before puberty results in imbecility (cretinism); complete removal in later life results in myxedema, with its slowing up of bodily and mental functions and other abnormal consequences. Yet in some cases four fifths of the thyroid substance