blood vessels of the arm, and this probably due to relaxation of the tone of the cutaneous vessels. This appears to be convincing, despite the objection of Meltzer that this dilatation might be due in part to relaxation in the tonicity of the skeletal muscles during sleep. The observations of Howell have been conducted with such care that his theory of the immediate cause of sleep merits quoting at some length. It lies in a vascular dilatation (of the skin) that causes a fall of blood pressure in the arteries at the base of the brain, and thereby produces an anæmic condition of the cortex cerebri. This condition of anæmia in connection with the withdrawal of external stimuli, causes a depression of the psychical processes of the brain cells below the threshold of consciousness. In addition to the effect of the cerebral anæmia, an accessory favouring condition may be found in a certain degree of fatigue of the parts of the brain mediating psychical processes. Portions of the sensory and association areas of the cortex must be active during the greater part of the waking period, and probably therefore lose their irritability to a greater or less extent Upon the withdrawal of the normal blood supply their irritability will tend to fall more quickly below the threshold of consciousness in consequence of this fatigue. According to Howell, then, the three factors which combine to produce normal sleep are: (1) A diminution of irritability, caused by fatigue, of large portions of the cortical area (2) voluntary withdrawal of sensory and mental stimuli involved in the preparations for sleep; (3) the above described diminished blood supply to the brain. Substantially the same theory is advanced by Hill[10], save that, for him, the cerebral anæmia is brought about by relaxation of the tone of the splanchnic area which reduces general arterial pressure and correspondingly reduces the venous; the latter factor tends to retard the flow of blood through the brain. As Howell very properly remarks, it is possible that there is a lessened volume of blood in the vessels of the viscera, but this requires experimental evidence before we accept it as a fact. So much for the circulatory theories. It will be admitted, I think, that various general measures based upon these theories, notably the use of baths, may tend toward the relief of insomnia; that they do not materially aid us in assigning the mode of action of drugs is true.

The chemical theory of sleep, whether we take into consideration that of oxygen as advanced by Sommer[11], or of the lactic acid of Preyer[12], or of the catabolism which results in combined oxygen and carbon (CO_2) of Pflüger[13], and in advance but a step to Cappie[14], who believed that there was (1) diminished molecular activity of the cerebral cells coincidently with capillary anæmia of the brain, and conse-