

any, disturbance or break of action between the respirating and circulating functions.

"6. Its final escape from the organism is rapid, so that the symptoms of recovery are sudden.

"7. In some cases it produces vomiting.

"8. When it kills it destroys by equally paralyzing the respirating and circulating mechanisms.

"9. It interferes less with the muscular irritability than perhaps any other anæsthetic.

"10. It combines with ether and with chloroform in all proportions."

Dr. R., with characteristic candour and modesty, remarks: "I leave the bichloride of methylene with the profession for its observation and experience. I have proved the agent, by experiment on the lower animals, to be a good general anæsthetic. I have inhaled it myself with safety, and I have administered it to the human subject with success in the extremest operations for which general anæsthesia is demanded. Here, as an individual inquirer, I come back into the ranks and rejoin the rest of my brethren as an observer. Having no other ambition than that of being a physician in the widest sense, having even a painful aversion to specialty, and having no desire to press any subject unduly, I have produced this lecture as a contribution to pure science and nothing more, holding myself as free as any one else to condemn, improve, or approve, as future knowledge, framed and squared and fitted by wisdom, shall determine. When twenty thousand persons shall have slept away pain under the influence of 'Chloromethyl,' as Mr. Spencer Wells has tersely named the bichloride of methylene, and those of them who have slept too deeply shall be counted as fewer than ten, an advance over chloroform will have been proved, but not sooner, nor with less of that tribulation through which we must ever attain to the good that is great and persistently beneficent."

10. *Physiological Action of Chloroform, Sulphuric Ether, Amyline, Carbonic Acid, and Carbonic Oxide.*—BERNSTEIN (*Moleschott's Untersuch.* x. p. 280) concludes that the effects of chloroform are not due to an action on the blood-corpuses, as Hermann asserted (*Journal of Anatomy and Physiology*, 1867, p. 155), but to a primary action on the spinal cord. He also infers from his experiments that chloroform produces anæsthesia by acting on the sensory nerve cells, and not on the nerve fibres. Important researches on the actions of chloroform, sulphuric ether, and amylene have been undertaken by Professor RANKE, of Munich (*Centralblatt*, No. 14, 1867). He believes that in large doses these substances paralyze the terminations of the motor nerves, and that the early appearance of *rigor mortis* is due to their action on myosine (muscle fibrin). Rigor occurs more rapidly after death from chloroform than from either of the two other anæsthetics, and the same order is observed in the rapidity with which a solution of myosine becomes clouded when exposed to the vapours of these substances. They also coagulate solutions of nerve albumen. From experiments with lower animals, Bernstein concludes that sulphuric ether is a less dangerous anæsthetic than chloroform. One of the most remarkable of the investigations on chloroform is that published by Dr. FAURE (*Comparative Researches on the Effects of Chloroform and Carbonic Acid*, *Archives Gén. de Méd.*, May, 1867, p. 557). Its object is to examine the method in which chloroform and other substances produce anæsthesia; and the general result is that the effects of the inhalation of carbonic acid and chloroform are essentially those of impairment of respiration. Chloroform is said to modify the portions of the pulmonary surface with which it is brought into contact in such a way as to render them impermeable to the air, in virtue of its power of coagulating albumen, and hence to interfere with respiration; and the anæsthesia it causes is asserted to be merely one of the early symptoms of asphyxia. Among other ingenious experiments, the following is given in support of this view. A caoutchouc tube, having one end attached to a vessel containing chloroform, was passed down the trachea, *beyond its bifurcation, into one of the bronchi*, and a large quantity of chloroform was so inhaled by an animal; but no anæsthesia was caused. The tube was then so far withdrawn that it did not

extend to the bifurcation; and after a very few inhalations complete anæsthesia ensued. During this condition it was again advanced beyond the bifurcation into a bronchus; and although chloroform continued to be inhaled the anæsthetic condition gradually disappeared. Thus, if one lung or a portion of one lung is only acted upon by chloroform, no anæsthesia is produced; if both lungs are acted upon, anæsthesia supervenes; and if, during this anæsthesia, one lung is removed from the direct influence of chloroform, the anæsthesia ceases, notwithstanding the continuance of chloroform inhalation by the other lung. Carbonic acid was found to act in the same way. When carbonic oxide, however, was brought into contact with only limited portions of the pulmonary surface, its characteristic effects were nevertheless quickly produced. It thus appears, according to Dr. Faure, that chloroform resembles carbonic acid in acting only by interfering with respiration, and not as a systemic poison; carbonic oxide, on the other hand, passes through the lungs without producing any changes of such a nature as to interfere with respiration, and its symptoms are caused whenever it is absorbed into the system. Many of the experiments in Dr. Faure's paper are worthy of repetition by independent observers, and his conclusions are certainly of such importance as to require and deserve confirmation.

M. P. BERT has examined whether a stage of excitement occurs during the action of chloroform and ether, in the sense of a true stimulation of the cerebro-spinal nervous system preceding the stage of depression (*Archives Gén. de Méd.*, May, 1867). This he denies, because, among other reasons, if the spinal cord be divided before the inhalation no symptoms of excitement occurred below the incision, but yet reflex power became abolished there; while above the incision the usual movements occurred. These movements, which constitute the symptoms of the stage of excitement, M. Bert refers to irritation of the mucous membranes by chloroform vapour.—*Journ. Anat. and Phys.*, Nov. 1867.

11. *Chloroform and its Medical Uses.*—The *Dublin Quarterly Journal of Medical Science* for August, 1867, contains a paper on this subject by Dr. C. KIDD, which does not add materially to our knowledge, but we call attention to it in consequence of a remarkable statement which he makes, and which we must confess to be altogether new to us. He states that "the highest American authorities have now decided it [ether] is quite as dangerous as chloroform." Dr. Kidd should have given the names of those whom he considers as the "highest American authorities," for we are under the impression that these authorities entertain the very opposite opinion. Indeed, while some advantages are claimed for chloroform over ether as an anæsthetic, its superior safety is surely not one of them.

12. *Action of Sulphate of Quinia.*—EULENBURG (*Comptes Rendus*, March 4, 1867), concludes, from an extensive series of experiments on frogs, that sulphate of quinia acts energetically as a paralyzer of the respiratory movements and of the heart. The former cease from ten to sixteen minutes after the administration of doses varying from half a grain to two grains. The effect on the heart is independent of, and occurred several hours after, the stoppage of respiration. It is supposed to be due to an action on the cardiac muscle itself and on its excito-motor ganglia; as previous division of the vagi did not prevent it. Among other phenomena, it was found that this substance destroys the function of the spinal reflex centres, and afterwards those of the centres of sensation and of voluntary movement in the cerebrum. Some doubt is cast on this research by a subsequent one of M. JOLYET (*Comptes Rendus*, 2 Avril). This investigator found that when sulphate of quinia was injected under the skin of the feet the effects were quite different from those of its injection under the skin of the back. The latter method was adopted by Eulenburg; and Joylet asserts that Eulenburg's principal results were, therefore, caused by the direct action on the heart that such administration admits of, and that many of the subsequent phenomena and their sequence were caused by the natural extension, by imbibition, of the substance injected.—*Journ. Anat. and Phys.*, Nov. 1867.

13. *Action of Curare.*—Dr. HERMANN (*Reichert und Du Bois Reymond's Archiv*, 1867, p. 64) has explained by a simple experiment why a dose of curare