

four minutes, which is equivalent, in a man weighing two hundred pounds, to a litre, or about one quart; while in Experiment 15, three hundred cubic centimeters given to a dog weighing less than forty pounds did not produce death, and it required a total of four hundred cubic centimeters to produce this result. The equivalent to this injection in a man of one hundred and sixty pounds would be about three pints of air.

It is not necessary to quote further experiments which illustrate the fact that the doses of air which were employed by Dr. Goodridge were so massive that their effects cannot be compared with those which are produced by those minute quantities of air which might, perchance, be drawn into a vein. It is also a noteworthy point that not only did some of Dr. Goodridge's dogs survive these enormous injections, but in several instances he states that they recovered so rapidly that subsequent experiments were made upon the same animals. According to his own summary of his results, nine dogs recovered after aspiration of their hearts, while two others, which finally recovered, required large quantities of air—"two hundred and fifty to four hundred cubic centimetres"—to be injected forcibly before the pulse disappeared temporarily.

Dr. Goodridge also states that rapid injection of air is an important factor in producing bad results, and that considerable quantities of air may be slowly injected without any serious effect.

I do not doubt that such a quantity of air as eight hundred cubic centimeters, or nearly a quart, would produce a disastrous effect if it found entrance to the jugular vein of a man, and I do not deny that much smaller amounts may cause alarming symptoms, or even death. My claim is—and it is supported by the exhaustive experiments of Senn and myself, my personal experience with air embolism in man, and by Goodridge's own observations—that even a large air embolus is not as fatal as a small air embolus has been thought to be, and that the danger of the occurrence of air embolism is very slight. As was proved by Senn's researches, it is useless to conclude from massive injections in dogs that small ones in man are deadly.

Finally, it is not to be forgotten that in all probability different resistance to air embolism exists in different animals. Rabbits and monkeys are very susceptible, whereas dogs and goats are extraordinarily immune.—*The American Journal of the Medical Sciences.*