

two methods was at its height, it was pointed out by Wendel that the difference in the atmospheric pressure between Breslau and Marburg exactly corresponded to the normal difference between intrathoracic and intrapulmonic pressure, which in man, according to Friedrich, is 7 mm. of mercury. Thus, if Sauerbruch and Brauer were operating simultaneously under normal barometric conditions and with the use of the two methods, the pressure effects would be precisely the same. The Breslau cabinet would register the Marburg atmospheric pressure while the patient's head was under Breslau atmospheric pressure, and Brauer in operating would raise the mask pressure to the reading of the Breslau barometer and open the thorax under Marburg pressure.

A still simpler illustration might be cited in the effect of our own mountain elevator, where in a descent of approximately 250 feet, a pressure difference of 7 mm. of mercury is borne without noticeable respiratory or circulatory disturbance.

Thus, we may accept as proved that the opening of the chest in a rarified atmosphere, or the maintenance of lung inflation through the use of a pressure mask, have within normal pressure limits identically the same effect upon the circulatory apparatus and pulmonary viscera.

Before the advent of these modern methods of preventing lung collapse, pneumothorax could be prevented or avoided either by (a) existing inflammatory adhesions between the parietal and visceral pleural layers; (b) the artificial induction of adhesions through intrapleural instillations of chemical irritants; (c) the suture of the pleural layers about the field of operation; or by (d) plugging the thoracic opening by the withdrawal of a portion of the lung. The limitations of intrathoracic work with the aid of such protection are self-evident. Under such conditions extensive exploration of the pleural cavity is out of the question, and the risk of final collapse or grave respiratory or cardiac embarrassment through traction upon the lung is not thereby obviated. In addition to the work of Sauerbruch, Brauer, Petersen and Friedrich, a mass of instructive experimental intrathoracic surgery has been carried out on this continent by Robinson, Green, W. Meyer, Janeway, Flint and others.

Although pneumonectomy was the operation first practised in connexion with the experimental use of Sauerbruch's negative pressure chamber, the results have, until quite recently, been unsatisfactory owing to the following causes:

- (1) Primary infection of the pleura through the operation wound or divided bronchus.

- (2) Pneumothorax and secondary infection owing to faulty closure of the bronchus.