

may contribute still farther to this result by using drainage tubes so arranged with valvular openings as to give free egress to the air while impeding its entrance. Such tubes are easily prepared by closing the outer end and cutting a tongue on the side of the portion which is to project from the chest. Even though the tube may not fit accurately in the wound, and air may pass beside it, still this valvular arrangement will have some effect in lessening the internal pressure and thus favoring expansion of the lung. Indeed, unless such tubes are employed, I should condemn entirely the method by drainage tubes as distinguished from the free incision. It is easy to see that with a small opening the comparatively long inspiration would fill the cavity with air which would not readily escape in the shorter time allowed for expiration, and that thus there would be a pressure upon the lung during expiration which would tend to strip it from its newly formed adhesions to the chest wall. And, inasmuch as complete adhesion of the pleural surfaces is the condition upon which the abscess is gotten rid of, this adhesion must above all things be promoted.

It is usually necessary, however, to resect a portion of rib, in order to maintain a sufficiently large opening for the drainage tubes, and in old and neglected cases in which the lung is not likely to expand fully, it is probably better to remove enough bone at the first operation to allow the necessary falling in of the chest. But in any case, the opening made in the first instance should be large enough to secure the removal of any fibrinous masses which may be floating in the pus. These masses are sometimes quite large, and if retained in the abscess cavity are likely not only to obstruct the drainage, but by their decomposition to give rise to sepsis.

A sufficiently large opening having been made, it should be kept open by the insertion of two or more large valvular drainage tubes placed side by side. Granulations form rapidly around and between the tubes, and soon close all the exterior space. The air then finds but scanty entrance into the cavity, and with each inspiration an expanding force is exerted upon the compressed lung. At the same time in coughing, laughing, etc., the air within the cavity is readily driven out through the valvular openings and thus opposes no obstacle to the expansion of the lungs. We

thus have the resources of nature conserved to the greatest degree possible and applied to the expansion of the lung. But I believe that we may go still farther, and so assist nature as to obtain, even in the most unfavorable cases, more favorable results than could otherwise be secured. The distending force derived from the sound lung may be employed at pleasure by the patient, and he has it in his power to graduate this force according to the sensations produced in the lung. Let him then be instructed to take a deep inspiration, close the nostrils, and make a long steady expiratory effort, so regulating the force of this effort as not to cause any considerable pain in the affected lung.

This procedure may be repeated many times each day, and unless the air-tubes and air-cells are entirely obliterated there can scarcely fail to be a gradual inflation of the compressed lung.

And now a few words in regard to washing out the cavity. A common error is that of using antiseptic solutions of such strength as to impair the vitality of the delicate connective tissue which is the immediate agent in effecting the union of the opposing surfaces. Such solutions, applied often, also with too much pressure, are responsible for many failures to secure the best attainable results. They are also liable to produce poisoning by absorption into the circulation. This is especially true of carbolic acid, which cannot be used in any efficient strength without danger, and should therefore be discarded entirely. Time will not permit a consideration of the various disinfectants that may be employed in the comparatively rare cases in which their use is indicated. It is only when the temperature and the condition of the discharge give evidence of the presence of septic material that antiseptics should be employed. Bowditch found washing out the chest necessary in one case in 399 operations. If the discharge has an offensive odor, irrigation of the cavity with simple boiled water, or with a solution of mercuric bichloride in the proportion of one to ten or twenty thousand, or with creoline one to 500 or 1,000, will usually suffice. These fluids must be introduced with very slight pressure, and the greatest care must be observed to secure ample outlet for the return current.