Much less is known of the lymphatics of the pleura and chest wall. There are two main directions of lymph flow—forwards to the internal mammary chain of nodes and vessels, and backwards to the posterior mediastinum. Some of the lymphatics of the lower intercostal spaces drain downwards, through the diaphragm, to reach the cisterna chyli. Some of the mediastinal lymphatics communicate directly with the thoracic duct while the majority run upwards to join the paratracheal and pulmonary lymphatics and then drain by one or more vessels into the veins at the base of the neck near the thoracic duct.

The radiological appearances of the abnormal lymphatics in lymphangitis carcinomatosa, pulmonary oedema, etc., are discussed.

### Lymphography

W. F. WHITE The lymphatics and lymph nodes draining many parts of the body may now be demonstrated by lymphography.

Visualization of the lymphatics is achieved by the subcutaneous injection of a suitable coloured material, and following cannulation radio-opaque material may be injected. In this way it is possible, by injecting the lymphatics on the dorsum of the foot, to visualize the inguinal, iliac and para-aortic nodes, together with the cisterna chyli, and the thoracic duct in some instances. The para-vertebral lymph nodes in the chest may be seen, but this is extremely variable.

The oily contrast medium enters the great veins and forms microemboli in the small pulmonary vessels. The complications of the technique are invariably manifest in the chest.

This communication concerns the demonstration of lymph nodes, the thoracic duct and the pulmonary complications of the technique.

### Chylothorax and Chylous Reflux

K. ROSS A review is presented describing briefly the normal physiology of the thoracic duct and the aetiology of chylothorax.

The practical management of chylothorax is discussed in greater detail and the problem of chylous reflux, as it affects the pleural lymphatic system, is commented upon.

### Physiological and Pathological Mechanisms Governing Fluid Accumulation within the Pleural Space

W. LECKIE Animal work illustrating the mechanisms responsible for preventing fluid accumulation within the pleural space is briefly reviewed. Predicted values for fluid and protein clearance in health are also deduced from animal studies.

Pathological mechanisms affecting fluid and protein balance within the pleural space are discussed, and the three factors (1) alterations in pleural capillary hydrostatic pressure, (2) alterations in pleural capillary permeability and (3) changes in lymphatic drainage, are related to different clinical conditions, *e.g*, pleural tuberculosis, malignancy, pulmonary infarct, congestive cardiac failure and Meigs's syndrome.

The effect of intrapleural corticosteroid administration on protein turnover in the pleural space is discussed.

Finally, in the light of these observations, a few recommendations regarding terminology and management are made.

### Clinical Manifestations of Disorders of the Pulmonary and Pleural Lymphatics

PETER EMERSON The role of the lymphatics in pulmonary oedema is described with mention of drainage of the thoracic duct as a method of resolving intractable oedema in congestive failure and cirrhosis of the liver. The concept of chylous reflux and its clinical presentation is described together with the effect and the developmental abnormalities of the lymphatics of the lungs and pleura, *i.e.*, congenital pulmonary lymphangiectasis in infants and pulmonary and pleural disorders associated with developmental lymphoedema in adults.

### SPONTANEOUS PNEUMOTHORAX IN CYSTIC FIBROSIS

P. F. MITCHELL-HEGGS Five cases of cystic fibrosis complicated by eight pneumothoraces are described. These cases come from a group of 49 patients who have attended the Brompton Hospital between 1964 and 1969 for management of their cystic fibrosis. Three of the patients, who had a total of six pneumothoraces, were managed by pleurectomy. Spontaneous pneumothoraces were a terminal event in a fourth patient and an incidental finding which required no specific treatment in a fifth patient.

The possible aetiology of the pneumothorax in cystic fibrosis is discussed with particular consideration of the known alveolar hypoplasia and overdistension and the abnormality of the visceral pleura. The results of pleurectomy in three patients are discussed both in relation to the successful avoidance of further pneumothoraces and in the notable absence of a restrictive ventilatory defect.

In view of the relative success of pleurectomy it is suggested that this treatment should be considered for the management of any patient with cystic fibrosis who develops a spontaneous pneumothorax.

### PROBLEMS WITH LONG-TERM ENDOCARDIAL PACING IN CHILDREN

A. H. M. SIDDONS, K. CHATTERJEE, A. M. HARRIS and M. PEARD Fortunately it is uncommon that a child needs long-term cardiac pacing. Such patients usually have persistent complete heart block after cardiac surgery or repeated Stokes Adams attacks associated with congenital (and sometimes acquired) complete heart block.

Eight children aged 7 months to 15 years have had long-term pacemakers implanted, and all are still being paced at 9 to 31 months. Complications encountered relate mainly to the need to lengthen the endocardial electrode with growth, and the implantation of a large foreign body.