IN THIS discussion we are concerned with the treatment of patients who have symptoms of bronchiectasis, and who, upon lung mapping, show dilatations of the bronchial tree. Cough and expectoration are the universal symptoms and it is for relief of these that the bronchiectatic patient most often presents himself. Other symptoms, such as hemoptysis, fever, chills, sweats, fetor, emaciation, dyspnea, and chest pain, often occur and may necessitate special consideration. Joint pain and skin eruptions are not unusual symptoms and frequently disappear when adequate drainage is established. Gastro-intestinal disturbances are less frequently encountered, but when present indicate a severe toxemia and suggest an amyloid disease. These symptoms, too, often improve and sometimes disappear with adequate drainage.

Upper respiratory infections are encountered so often in association with bronchiectasis that a number of authors feel there is a direct relationship between the two conditions. Many theories such as direct extension through the respiratory tract, infection through the blood or lymphatic stream, and aspiration of infected material have been advanced in explanation of this. As yet there is no agreement of opinion as to which of the conditions is primary and which is secondary, or whether both are manifestations of the same disease in different locations. Although it is generally conceded that treatment of the infection in the nasal accessory sinuses will not cure bronchiectasis, it is our opinion that possible sinus infection should be suspected in every patient having bronchiectasis and when present should be adequately treated. Because of this, it is our practice to routinely x-ray the sinuses of all of these patients. Since the infection in the sinuses not infrequently produces no localizing symptoms, this precaution has often enabled us to diagnose unsuspected sinus disease and, by having this condition treated, make possible the relief of both conditions simultaneously.

It is agreed that a cure of bronchiectasis can only be effected through surgery and, unfortunately, surgical removal of the diseased tissue is applicable in only a relatively small percentage of those afflicted. Pneumotomy was probably the first surgical procedure employed in the treatment of bronchiectasis, but since simple incision and drainage of a dilated bronchus is insufficient to afford much relief in a disease characterized by multiple pockets, this method of treatment has been largely discarded. Treatment by cautery pneumectomy was described by Sauerbruch in 1920 and by Graham in 1923. It is utilized rather extensively by the latter in cases he considers unsuitable for other forms of surgery. Graham in 1921 also recommended intrathoracic compression with gauze packs, but this procedure was found to have only a limited applicability. Thoracoplasty was utilized by a number of surgeons in the treatment of bronchiectasis, and in 1924 Hedblom, one of the strongest advocates of this procedure, reviewed the literature on thoracoplasty in the treatment of bronchiectasis and summarized the results. It is rarely mentioned in current literature. Phrenicectomy was also used and symptomatic improvement was reported in a number of instances. It has since been abandoned because of the temporary nature of the improvement and the possible harm resulting from interference with drainage. Oleothorax and plumbage have been tried, but have not proved successful. Pneumothorax has been advocated in the treatment of bronchiectasis since 1903, and in 1923 Tillman collected sixty-five cases reported in the literature. Relatively few reports have appeared since. It is generally agreed that pneumothorax can do but very little good in the average case, and may be harmful. We have utilized pneumothorax in a few instances to control massive hemorrhage and have found it useful for this purpose, but we have not observed any curative effect on the bronchiectasis.

Lobectomy and pneumonectomy have become increasingly more popular in recent years, and although the operative technique has been constantly improved it remains, even in the hands of skilled surgeons, a serious sur-
gical operation. The perfection of lobectomy and pneumonectomy has been largely responsible for the success attributed to surgery in the treatment of bronchiectasis since excision of the diseased area is the only hope of permanent cure thus far developed. It is, therefore, replacing other surgical methods such as pneumotomy, cautery excision and collapse therapy. It has many limitations, but its indications are chiefly limited by the extent of the disease and the ability of the patient to withstand a serious operation. Best results are obtained in young individuals showing little or no evidence of toxemia, and found by lung mapping to have bronchiectasis confined to one lobe. Alexander states that lobectomy or pneumonectomy should never be performed for the cure of bronchiectasis without first mapping the entire bronchial tree. The mortality from lobectomy in a select group of young individuals without toxic symptoms may not exceed 3 or 4 per cent. Churchill reports his last thirty successive lobectomies for bronchiectasis and cystic disease completed without mortality. This is one operation that is usually better withstood by children, as contrasted with their reaction to abdominal operations. According to Romanis and Sellors, patients having moderate toxemia carry an operative mortality of about 17 per cent from lobectomy. In the more toxic group the mortality from this operation may be 35 to 40 per cent. They also feel that a surgeon exercising fair judgment in undertaking a number of operations on patients in both the latter groups will have a probable mortality rate of fifteen or more per cent. In addition to shock, they enumerate as other possible risks emphysema, spreading pneumonia, bronchial fistula, atelectasis, and gangrene. The late results from lobectomy and pneumonectomy are not available since too few cases have been followed over a sufficiently long period of time, but available data indicate that favorable results will be permanent.

The non-surgical treatment of bronchiectasis includes such measures as rest, or the so-called sanatorium regime, diet, climate, heliotherapy, intravenous therapy, vaccine therapy, inhalations, bronchial lavage, roentgen therapy, postural drainage, bronchoscopic drainage, and direct intrabronchial application of drugs.

Rest often affords temporary symptomatic relief, but seldom lasting improvement. Symptoms usually return upon resuming exercise. All forms of diet have been employed, including high caloric, high vitamin, and allergic diets. Each of these may have a place in the treatment of certain individuals with bronchiectasis, but are not important in the general management of the disease.

Change of climate may improve the condition of some patients, but usually is not worth the cost entailed. Beyond the avoidance of irritant gases and extremes of climate there is little evidence to indicate that a change of climate is of more than temporary benefit.

The use of sun-light, quartz light and other lights has no particular value in treatment.

The intravenous administration of salvarsan and other drugs may be helpful in combination with other forms of treatment. Its usefulness is limited to a few of the cases with fusiform spirochetal infection.

A few cases of symptomatic improvement are recorded from the use of vaccines, but it is generally agreed that these have no particular value in the treatment of bronchiectasis.

The use of steam inhalations containing certain drugs such as eucalyptol, guiacol, and benzoin, formerly very popular, has been largely discarded.

Bronchial lavage, either through or without the use of the bronchoscope, has given way to bronchoscopic aspiration, postural drainage, and instillations of iodized oil.

Roentgen therapy using large dosage has been tried by a number of investigators and good results have been reported by a few. Berck and Harris report excellent results principally in the reduction of cough and expectoration in all morphological types and degrees of bronchiectasis. It is their opinion that this method of treatment is feasible as the sole treatment for chronic secreting bronchiectasis. Many other investigators have not been impressed by the improvement obtained with roentgen therapy.

Postural drainage is one of the few forms of treatment which has withstood the test of time. It may be made continuous while the patient is on bed rest, or the ambulant
patient may drain at more or less frequent intervals. Some authors advocate drainage hourly, but this is not practical for patients who are employed, either during hours of employment or of sleep. Many patients can drain three or four times daily and remain relatively free of cough and expectoration.

The value of the bronchoscope in the treatment of foreign body bronchiectasis, and certain cases having partial bronchial stenosis is obvious. The foreign body should be removed and bronchial constrictions dilated if possible. It has been proved that bronchoscopic aspiration is the most effective nonsurgical means of emptying the bronchiectatic pockets of their secretions. Many patients are afforded considerable symptomatic relief by repeated bronchoscopic aspirations.

The intrabronchial application of drugs by syringe or spray is not new, since for many years various drugs have been injected into the trachea and bronchi in the treatment of bronchitis and bronchiectasis. At the present time, iodized oil is extensively used in the treatment of these conditions and is relied upon almost solely for accurate diagnosis of bronchiectasis. So far as we know it has no definite bacterioidal properties and we feel that its apparent beneficial action is probably largely mechanical.

Studies by Jacobaeus, Selander and Westermark on the emptying capacity of the bronchi led them to believe that they could distinguish two phases in expectoration. The first phase, an expression of the emptying capacity of the larger bronchi, and the second phase, corresponding with the emptying of the bronchioles and alveoli. The injection of lipiodol will often hasten the first phase emptying and since the oil is heavier than the sputum may make the evacuation of pus more complete. Ballon and others have shown that lipiodol may remain unchanged in the normal lungs for weeks or months. They observed no lymphatic distension and hence no subsequent infiltration or fibrosis. Some investigators think that the iodine absorption may be an important factor in the influence of iodized oil on bronchiectasis. Others have shown that all inflammatory foci have a high affinity for iodine and store it in abnormally high amounts. Since the distribution of the dilatations of lipiodol remains unchanged following the administration of the oil, it would seem to be most helpful in the less advanced forms of bronchiectasis. Ochsner, Lenk, Haslinger, Sgalitzer, D. H. Ballon and others have noted striking improvement following the therapeutic use of lipiodol. Other investigators report little or no improvement following its use. Our experience leads us to believe that when properly used, iodized oil is helpful in a large percentage of cases suffering from bronchitis and bronchiectasis.

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