Anonymous (1939): The Havelock asbestos mine, Swaziland. – Bull. Imp. Inst., 37(3):469–471.

tolerance 0·001 mm. The plates so far employed as resonators have been of the order of 41 × 21 × 0·7 mm.

The Havelock Asbestos Mine, Swaziland.—Chrysotile asbestos has been worked in the Transvaal since the beginning of the century and for most of this period the New Amianthus Mine of New Amianthus Mines Ltd., a subsidiary of Turner & Newall Ltd., has been the leading producer. Recently this mine has become exhausted and its place is being taken by the new Havelock Mine in Swaziland. The history of the enterprise together with a description of the mine are summarised in the *South African Mining Year Book* (1938-9, pp. 43-47) and the *South African Mining and Engineering Journal* (May 6, 1939, pp. 289-294).

The Havelock Mine is situated about 12 miles south-south-east of Barberton, 10 miles from Pigg's Peak and about 50 miles from M'babane, the capital of Swaziland. Although reports of mineral occurrences in this area had been current for a long time, it was not until after the Great War that the existence of asbestos here on a very large scale became known. In 1928 and 1929 this area was thoroughly prospected and passed through the hands of various syndicates in Johannesburg. During the last eight months of 1929 the prospecting campaign was intensified and then, in spite of the trade depression, Messrs. Turner & Newell purchased 100 base metal claims for £240,000, which was said to be the largest amount ever paid in South Africa for a base mineral prospect. These claims, which now comprise the Havelock Mine, are laid out in a regular block approximately 5,000 ft. by 1,200 ft., the long side of the area running more or less north and south across the Tutuz River, which divides the mine into a western section and an eastern section. In 1929 the approach to this isolated spot was through some of the wildest country to be found anywhere in the Union or Swaziland.

Seven years later, when the New Amianthus Mine at Kaapsche Hoop was almost completely exhausted, it became necessary to prepare the Havelock Mine for production, and serious work commenced in April 1937 following upon a very heavy rainy season. It was first necessary to construct an all-weather road from the railhead at Hectorspruit to the mine and the Transvaal and Swaziland Governments co-operated with the mine owners to provide a highway for a total distance of 55 miles to Pigg's Peak, the last 12 miles from Pigg's Peak to the mine over the most difficult country being built by the mine owners. Modern houses fitted with every convenience were then built for the staff. A road is also under construction from the Barberton side.

Rapid development work has been carried out since

September 1937, following upon the installation of compressed air equipment. Most of the fibre occurs in a soft green massive serpentine which has a continuous strike of 4,500 ft. with an average width of 110 ft. and which dips at about 50°. There are innumerable intersecting cross-fibre veins of chrysotile which often reach an appreciable length and in some cases 1½ in. in thickness. This ore body is overlain by other serpentine and chert. Mining is to be carried on both by quarrying operations and by stoping from the third level. Before quarrying operations can commence, however, it will be necessary to remove no less than 4 million tons of wall rock and overburden. All the ore quarried will be gravitated to the shaft loading pocket through winzes sunk in the ore-body and which are connected with the main haulage level. In this way the handling of ore in the quarry will be reduced to a minimum. The special method of stoping to be used is that which has been evolved and used with success at the Shabanie Mine; it is a combination of shrinkage stoping and top slicing which enables the ore to be sorted underground. Some 50 to 60 per cent. of waste can thus be removed and used for stope filling, all the waste rock from subsequent treatment being also returned for this purpose. By this method mining costs have been brought to the low figure of about 1*s.* 6*d.* per ton.

By May 1939 a main shaft had been sunk at an incline of 40° for a distance of 850 ft. After encountering very bad ground in the first 200 ft., owing to the great depth to which the serpentine in the footwall of the ore-body has been decomposed, it was necessary to employ the François cementation process to control the ground movement. A drainage adit had been driven a total distance of 3,800 ft. and connected with the main shaft. Development work resulted in opening up for stoping 14 million tons of reserves, all of which was situated above the horizon of the drainage adit.

It is estimated that the initial production will amount to 24,000 tons of high-grade fibre yearly, an amount nearly equal to the total production of the Union in 1937. Four grades are to be produced: No. 1, spinning fibre; No. 2, spinning fibre; No. 3, shingle fibre; No. 4, shingle fibre.

Owing to the difficult country in which the mine is situated, a journey of 140 miles from the mine to Barberton *via* Hectorspruit and Pigg's Peak would be necessary if ordinary surface methods of transport were used and it was therefore decided to employ an aerial ropeway. This ropeway, which was brought into commission in October 1938, has a total length of 12·6 miles and is of the bi-cable type. Its outward capacity is 7½ tons of bagged asbestos per hour and its speed about 6 miles per hour. The terminal at Barberton is located in the South African Railway station reserve where the main storage

shed has space for 1,000 tons of bagged fibre in addition to storage for crude oil, coal, and general mining stores. From Barberton the asbestos will be railed to Lourenço Marques for export.

Recent reports indicate that production has now commenced.

Properties and Uses of Peat.—Peat covers a very large total area of the land surface of the world, and although it occurs most abundantly in cool humid regions, it is not confined to temperate zones, and is found occasionally even in the tropics. The possible utilisation of peat is a matter of importance and a considerable amount of work has been and is still being carried out, especially in Scotland. The present state of knowledge of the subject has recently been summarised by Dr. W. G. Ogg (*Chem. and Ind.*, 1939, **58**, 375-9).

Peat is composed almost entirely of plant residues. The nature of the processes involved in its formation is still a matter of dispute, although it is now generally agreed that these processes are partly chemical and partly microbiological.

There are two main types of peat, the lowmoor and moorland groups, which differ both in the nature of the original plants and in the degree of decomposition, and hence in physical properties and in chemical composition. The lowmoor type is usually formed where ground water rich in plant nutrients collects in hollows. When the reaction of this type is neutral or alkaline, it is termed "fen" and where the original vegetation has consisted largely of trees and shrubs, the term " carr " is applied. Both fen and carr occur in parts of Great Britain, especially in East Anglia.

Where the water is very poor in bases the peat formed is usually low in mineral matter content and intensely acid in reaction. This type is known as moorland or moss peat, of which there are several varieties. Moorland peat is of widespread occurrence in the Highlands of Scotland.

Since peat is formed from plant remains, its constituents are mainly organic, although there is always present a small amount of mineral matter derived from the plants. The usual range for the composition of the organic matter is as follows: carbon, 50 to 60 per cent.; hydrogen, 5 to 6 per cent.; oxygen, 34 to 36 per cent.; and nitrogen, 1 to 4 per cent. The composition of peat is so complex that it is not surprising that there is considerable lack of agreement regarding the actual compounds present. Odén and other early workers extracted peat with alkali and precipitated the alkaline solution with acid. This precipitate was then further subdivided by means of solvents and names given to the different fractions obtained.