THE HAVELOCK ASBESTOS MINE

FIBRE-BEARING BODY OF EXCEPTIONAL WIDTH—HIGH GRADE OF CHRYSOTILE—ONE OF THE WORLD'S GREATEST FUTURE PRODUCERS.

Although owing to the depressed state of the market, Messrs. Turner & Newall, Ltd., have postponed the development of their great Swaziland chrysotile mine, the Havelock, there can be no doubt that when the mine is opened up it will prove one of the greatest producers of the highest grade of chrysotile fibre in the world. For the following authoritative description of the occurrence we are indebted to Dr. A. L. Hall's recently published work on "Asbestos in the Union." *Inter alia*, Dr. Hall writes:—Though not falling into the Union, the recent discoveries of chrysotile deposits in the extreme north-westerly portion of Swaziland are included in these pages, both on account of their very close proximity to the Transvaal border, and on their association with a geological structure that stretches from Barberton south-eastwards into Swaziland. Recent prospecting operations on Havelock's Concession have proved the existence of promising deposits of chrysotile within that area, about one mile in a direct line due east of the Transvaal border, and 12 miles south-south-east in a direct line from Barberton; these developments are commonly referred to as the "Havelock Mine."[1] They lie in very well watered country of tremendous relief, belonging to Moodies Series (Swaziland System) in which the thick resistant quartzites determine very prominent high ridges, separated by deep complex valleys defined by a regular network of perennial streams. One of the most conspicuous ridges runs along the Emlembe Quartzite and culminates in Emlembe Mountain, the highest point in the whole of the Barberton Mountain Land and some 6,030 feet above sea level; deep down in the floor of a little side valley is the Havelock Mine, over 2,000 feet below the giant Emlembe. The approach to this somewhat inaccessible spot is through some of the wildest scenery to be found anywhere in the Union or Swaziland; at present there is no route for the wheel transport that leads right to the mine. One mode of approach and the more amenable is along the main road from Hectorspruit via Jeppes Concession across the Lomati River to Piggs Peak Police Station.[2] This point may also be reached from Carolina via Oshoek and Forbes Reef, whence the route descends some 2,500 feet to the Komati River (Pont Ferry) and continues northwards up to Piggs Peak. In either case the last stage has to be taken along the old Piggs Peak-Barberton bridle path to a piece of level ground known as the "Station" (close to the old Devils Reef Gold Mine); this point is some 4-5 miles west-north-west from the Piggs Peak Police Post, and serves as a provisional delivery point for mine material, etc. There is also a direct route from Barberton across the mountains, via the Devil's Bridge. From the "Station" the Havelock Mine is distant about three miles south-west by a path that first descends into the deep valley of the Umkomazaana, then crosses that stream and rises to the divide between that stream and the adjoining river basin; the mine workings extend from the watershed south-westwards over the floor of a little stream known as the "Tutuz."

The Mine Described.

The Havelock Mine consists of a block of 100 claims that were prospected during 1928 and 1929; at the end of the latter year they were acquired by Messrs. Turner & Newall, so that the question of accessibility will doubtless be effectively dealt with in the near future. The above claims are laid out as a rectangular block approximately 5,000 by 1,200 feet, 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 (on the right side of the Tutuz) and an eastern section (on the left bank of the Tutuz) extending in the direction of the "Station" as far as the divide referred to above.

Owing to the excessive rainfall, the formations occurring at the mine are for the most part more or less highly decomposed, so that outcrops are rare and their rocks not very fresh. At the north-eastern end of the mine near the watershed there are definite indications of serpentine with highly pitted dark surfaces of weathering; some of these rocks are crowded with small rounded white spots of magnesite. From this point towards the bottom of the valley and beyond—over the western section—the contours are smooth and almost devoid of outcrops, with the exception of three bands of resistant cherty rocks which stand out as more or less continuous ridges. These features are built of very hard siliceous, in part ferruginous, rocks, on the whole not unlike the "Calico" type of rock, but low in iron. Underground work indicates the succession taken across the eastern section, over which the lower, middle and upper chert bands are all three clearly traceable. The dip is regularly to the south-east round 50 to 55 degrees; in the western section, however, the middle chert is not seen, and probably dies out gradually in passing across the eastern section. Between the lower and middle chert is a belt of a hard, dark bluish-grey formation without fibre (barren serpentine?), while between the middle and upper chert band a somewhat similar rock occurs, without fibre in it, and locally referred to as "barren serpentine" this is underlain by the asbestos-bearing formation—a soft greenish, "granular-looking" serpentine carrying the chrysotile seams.

Serpentinous formations form a good outcrop at the "Station" referred to (close to the Piggs Peak-Barberton bridle path) whence they probably strike down into the valley of the Umkomazaana River, towards and through the Havelock Mine, to continue further on into Josefdal; it would appear, therefore, that the basic intrusions, which subsequently passed into serpentine, occupy a definite horizon in Moodies Series, traceable for several miles along the strike and associated with the equally definite and persistent bands, described above as cherts.

Recent Development.

The deposits by the middle of 1930 had been opened up along the asbestos formation by some six drives, now up to about 1,000 ft. long; some 4,000 ft. of continuity along the strike has also been proved for the fibre carrier. At intervals of about 100 feet along the drives are a series of crosscuts in both directions; these indicate the persistence, through some 150 to 170 feet in a horizontal direction, of the fibre-bearing serpentine, until it meets the footwall or hanging wall of barren serpentine. In these workings the barren formation is a very fine-grained rock with a kind of coarsely schistose structure, and more or less highly altered, so that its exact nature is doubtful.

The fibre carrier is a soft green massive serpentine having a horizontal width of some 150 feet. Within it the cross fibre seams of chrysotile are disposed anyhow, more like a stockwork than a lode—some being inclined approximately with the dip, others across it at all sorts of inclinations. At the mouth of No. 2 West Adit a very fine display of fibre was observed, some six to nine seams being counted, several of which as much as 1½ inches thick; fibre continuity is maintained with fluctuating display right to the face of the drive (now some 1,000 feet long). The quality of the fibre is very good.

It is hardly necessary to point out that it is difficult at the present relatively early stage in the development of this interesting deposit to gauge both the correct percentage

[1] Its situation on the map accompanying Geological Survey Memoir No. 9 is ¾in. measured 16 degrees east of due south from the north-easterly beacon of Josefsdal No. 35.

[2] The routes, etc., are shown on the map accompanying Geological Survey Memoir No. 9 (Barberton District).

of fibre to rock and the proportion of textile chrysotile to be expected when the mine is fully developed and producing steadily. The exceptional width of the fibre-bearing body and the high grade of the chrysotile, together with the present nature of the seam display, are promising factors in this new occurrence, the future developments of which will be watched with much interest.

The exact nature of the barren serpentine and its relationship to the fibre carrier are not certain, but the geological associations are not unlike those observed, e.g., in some of the crysotile deposits in the Komati River valley, where one finds alternations of hard, dark, barren and soft greenish chrysotile-bearing serpentines; at the Havelock Mine the former may likewise prove in the end to represent a serpentinous rock derived from an essentially pyroxenic intrusion, the latter probably originating as a true olivine-bearing rock, chemically well adapted to the formation of chrysotile.

A Survey of South African Mineral Resources

PRESIDENTIAL ADDRESS BY DR. HANS PIROW — NEW AND OLD PROSPECTING METHODS — THE DESIRABLE CO-OPERATION OF GEOLOGISTS AND MINING ENGINEERS — ENQUIRY INTO OUR MINERAL RESOURCES—ONE OF THE WEIGHTIEST OF OUR PROBLEMS.

In his Presidential Address to the Geological Society of South Africa on Monday evening last Dr. Hans Pirow, the Government Mining Engineer, took as his subject "The Development of Ore Deposits in South Africa," and emphasised the importance and necessity of a thoroughly well devised survey of the country's mineral resources. Dealing with the improved methods of prospecting that are available nowadays, he pointed out that scientific knowledge and appliances were being more and more used, and that the old fossicking days had waned. "The picturesque type of pioneer, full of strange oaths and bearded like a pard, but withal a veritable storehouse of practical experience, appears to be fading away," he said. Geology, however, and indeed the country as a whole, owed the pioneers a great debt of gratitude. The young graduate, armed with the accumulated knowledge of recent years, with maps, photographic appliances and the rest, not to forget his hammer and bag, had largely taken their place. Generally Dr. Pirow endeavoured to indicate how closer co-operation might be obtained between the geologist and the mining engineer.

Modern Prospecting Equipment.

The value of aerial surveys by means of the aeroplane and the admirable way in which superficial stratigraphy could be observed from the air with the assistance of an experienced pilot was referred to, and in this connection the successful work accomplished in Canada by this means was quoted. Then there are geophysical methods. "Whilst as yet magnetic and electric prospecting have not been extensively tried out in South Africa, there appears to be no doubt that they will play a considerable role in the discovery and mapping of many of our mineral deposits." Great advance has been made, too, in the process of borehole surveys, and Dr. Pirow alluded to the Modder Deep borehole, "which gave results far more accurate than anything ever before achieved in this line." Among discoveries of value that have been made, mainly by scientific methods, Dr. Pirow instanced those of platinum in the Transvaal and of diamonds on the Namaqualand coast line.

Sampling and Valuation.

The co-ordination of the mining engineer and the geologist, as was specially stressed in the address, is not only of advantage in the matter of looking for ores. The sampling of mineral deposits is quite efficiently carried out upon the ore bodies of the Rand, but Dr. Pirow very aptly showed that it was not necessarily effective when tried, as it so commonly is upon other types elsewhere. The problem of the Witwatersrand ore reserves is, as a matter of fact, capable of being solved in a simple rule-of-thumb way. "But the problem ceases to be purely mathematical when we come to deal with deposits of a different type, e.g., those of pneumatolytic origin. It appears to me that in attempting a valuation of deposits other than those of fairly uniform grade and size the mining engineer might well seek the assistance of the geologist to a greater extent than has been the practice with us in the past." The geological work of Dr. Reinecke upon the Witwatersrand reefs proves the usefulness of geological methods even in a fairly uniform deposit, it was added. "Much more is such assistance necessary in dealing with deposits in which the persistence of the lode body and of its mineral content is intimately associated with its mode of origin."

Our Mineral Resources.

"The first essential to the successful exploitation of our mineral resources," said Dr. Pirow, "is a survey to determine what ores we possess and to what extent they are economically workable." Such a survey will need the united efforts of the Government, technical societies, and of private interests. Much has been done, but it must be admitted that the great bulk of our resources yet remain unknown. In this connection the work of the Geological Survey cannot be too highly commended, but the task suggested is one in which success can only be achieved by a union of the forces of all concerned. "I now submit," declared Mr. Pirow, "that the question of a survey of our mineral resources is one of the weightiest problems confronting scientific and technical men in South Africa."

The New Council.

Professor G. A. Watermeyer, a member of the Council and Vice-President for many years, was elected President of the Society for the ensuing year. Dr. H. Pirow, Dr. F. E. Keep and Dr. L. T. Nel were elected Vice-Presidents; and to the Council were elected Mr. C. J. Gray (re-elected Honorary Secretary), Dr. S. H. Haughton, Dr. P. M. Anderson, Dr. T. N. Leslie, Mr. E. Mendelssohn, Mr. A. R. Sawyer Dr L. Reinecke and Dr. S. J. Shand.

ZAAIPLAATS TIN MINING CO., LTD.

The output for the month of February, 1931, including tributors, was 20·40 long tons of concentrates of an average value of 72·60 per cent. metallic tin. The estimated loss for the month on the basis of an estimated price of £120 per ton metallic tin was £179 16s. 10d. before providing for Directors' fees and Government taxation.