

The drug, which is obtained from the ripe seed, has been recognized in different Pharmacopæias for many years as a valuable poison and for external use in cases of Myopia. Quite recently a further chemical examination by the Wellcome Chemical Research Laboratories has resulted in the isolation of a new alkaloid which will doubtless add to the value of the plant although the demand may be limited.

R. D.

COCAINE.

(*Erythroxylon Coca.*)

In the Agricultural Bulletin of the Straits Settlements and Federated Malay States page 336 vol. VII. there is an account of this plant as grown in the Botanic Gardens Singapore and a report from the Imperial Institute on a sample of dried leaves submitted by the late Mr. Machado for analysis and valuation. The colour of the leaves was not quite good but "the percentage of alkaloids present was equal to the average amount found in commercial supplies of Coca leaves from other sources." Planters are also cautioned that the demand is small and that leaves would be over-produced if extensively cultivated.

At the present time the price is high and leaves from the East appear to be exported from Java only. The plant is exceptionally hardy and is grown as a hedge-plant in the Singapore Gardens. There would be a great saving in handling and freight if anyone cared to try the production of Cocaine instead of exporting leaves.

R. D.

The Production of Cocaine in Peru.

This subject receives attention in a recent number of *The Engineer*, in an article which is reproduced in *Peru To-day* for September 1911. In introducing the article, the latter publication points out the importance of the cocaine industry in Peru; this is shown by the circumstance that the value of the annual production of the drug is £2,500,000. A great part of this is exported, while most of the rest is consumed by the native Indians.

The account in *The Engineer* states that the processes employed in Peru for the extraction of cocaine from the leaves of the coca plant (*Erythroxylum Coca*) are crude, owing to the fact that the treatment takes place in the interior, on account of the expense of transport of the leaves; the extent of this expense is illustrated by the fact that 200lb. of coca leaves are required for the manufacture of 1lb. of cocaine. Doubtless, improved means of communication will bring the manufacture nearer the coast, and then better methods will be employed.

For the extraction of the drug from the leaves, three operations are employed: (1) maceration, (2) intermediate precipitation, and (3) final precipitation. For maceration, the leaves are placed in four tanks, in the first of which they are treated with a 0.5 per cent. solution of sulphuric acid. After twenty-four hours, the liquid is allowed to flow into the second tank and the first is again filled with new leaves and the acid solution. After another interval of 24 hours, the contents of the second tank are run off into the third while the former is filled from the first as before, the first again receiving a new charge. The fourth tank, after another period of twenty-four hours, is filled from the third, and the preceding processes with the other tanks are repeated. In this way, leaves in a state for further treatment, namely, those originally put into the first tank, are obtained at the end of four days. The tincture thus obtained is next placed in a strainer, for the purpose of filtration, after which the processes of maceration is complete.

For the intermediate precipitation, the tincture is subjected to the action of sodium carbonate in cylindrical vessels. At this stage, in order to test if precipitation is complete, a small quantity of the tincture is removed, filtered from the cocaine, and the filtrate tested with ammonia, when there should be no precipitate formed. The obtaining of a precipitate indicates the necessity for the addition of sodium carbonate to the tincture in the cylindrical vessels.

The first operation for the final precipitation is the addition of petroleum, the mixture being stirred carefully for three to four hours at a very slow rate. At the end of this period the oil, which now contains the cocaine, is washed with acid-free water, and then treated with acidulated water, the proper amount being determined by the testing for precipitation of an aliquot part. During this process, the mixture is stirred vigorously for half an hour to forty minutes, with the result that the cocaine is transferred from the oil to the acidulate water, which can be separated from the former after the mixture has been allowed to stand for about a quarter of an hour.

At this stage, the extract is ready for final precipitation, which as before is effected with sodium carbonate, the amount required being determined by a test with an aliquot part of the solution. The mixture is then allowed to settle for twelve hours and, filtered while being washed with distilled water, to remove any excess of sodium carbonate. The wet residue of cocaine is finally subjected to pressure, when the drug is obtained as a white paste containing 87 to 93 per cent. The usual yield is about $2\frac{1}{4}$ lb. of cocaine per day of twenty-four hours.

When inferior leaves are used, the product is brownish in colour and has to be subjected to further treatment, similar to the above; this results, however, in the loss of some of the cocaine. A last matter of interest is that the approximate cost of producing 1 lb. of cocaine is about £5—an amount which naturally varies with the price that has to be given for the leaves.—*Agricultural News, West Indies.*