

would complete what he believed would be the most unique group of buildings in the world. It was intended for the higher technical education—for educating the captains of labour, and not merely the artisans, in a way that would enable them to meet the competition of Germany. The Germans had had these superior schools for years, and had been turning out a large number of expert and scientific men such as did not exist in England. They, however, hoped to make them exist in Liverpool, and he also hoped that this building would enable them to start in Liverpool many new industries that would give employment to the surplus population, and especially to females.

Speaking of the accommodation which would be afforded to the museum, Sir William reminded them that it had been founded by a bequest by the XIIIth Earl of Derby, some sixty years ago, and had been strengthened year by year by purchase. They were able to display only about one-half of their collections, and even that was so crowded that it was impossible to attempt any classification. This building would enable them to unpack and arrange scientifically the whole of their treasures, and in a short time they would have a museum unequalled out of London. When visiting Rome, Florence, Venice, and Athens, they were attracted there, not by what the Cæsars and Doges had done, not by the spoils of war, but by the monuments of art and the stores of literature which were left behind in these cities. In the same way he hoped that these buildings would tell future generations that, while they had been strenuously engaged in commerce, they had not been forgetful of the intellectual welfare of the citizens, knowing that by doing so they were promoting public morality as well as the material prosperity of the people.

#### ECONOMIC BOTANY IN NYASALAND.

THE following interesting notes on some of the exotic economic trees and shrubs cultivated in the Residency Grounds, Zomba, British Central Africa, are given by Mr. John Mabon, Government Botanist, in the annual report on the Protectorate for the year 1897-98 (C-9048). Accompanying the notes in the report is a complete list of exotic trees and shrubs growing at Zomba.

The collection of exotic plants grown at Zomba possessing economic value is not at present very extensive, but it is being steadily added to. The Coffee-disease Regulations in force prevent plants or seeds being imported from several tropical centres where we could obtain many valuable things, and the long journey from England hinders us from obtaining plants in Wardian cases from the Kew establishment or any of the large nurseries, except the consignment is taken in hand by some officer of the Protectorate, or the like, who is making the voyage out and sees it safely through. The authorities at Kew, having such unusual opportunities for distributing seeds, frequently forward valuable material to us, and many of the items mentioned emanated from Kew, either as seeds or plants. The list forms an interesting record of the cultural possibilities in the climate of the Shiré Highlands. There are but few countries where one can see such an essentially cool and northern type of vegetation as the Lawson cypress (which bears seed in enormous quantities) growing alongside such an essentially tropical type as the gutta-percha of Malaya (*Dichopsis gutta*). Although it is true the latter does not reach its proper degree of development, yet it is perfectly healthy, and it points to the fact that in the lower and warmer region on the Shiré River it would be a valuable culture.

Many of the items mentioned are only represented by one plant, and many of them are not old enough to have reached the fruiting period. Some of the introductions grow with surprising vigour. For instance, eucalyptus, the seeds of which were sown about six years ago, are now over sixty feet high, and would yield very capable timber if required. The well-known blue gum is not, however, a success here, but it seldom is in these latitudes below the 5000 feet level. Still there remains numerous equally good, and even better, members of this useful genus which we can cultivate with success.

Mauritius hemp (*Furcrara gigantea*) and sisal hemp (*Agave rigida*, var. *sisalana*) grow with great freedom, and while it would scarcely pay to cultivate these valuable fibres at present for the European market, yet if any textile industries arise

locally there can soon be plenty of raw material at hand to supply them.

Seeds of the celebrated China grass (*Boehmeria nivea*), a fibre very much in demand now, have been ordered, and it is intended to demonstrate that it is a profitable culture that might be grown in Nyasaland with the object of exportation to the European markets. Arnatto (*Bixa orellana*) fruits with great profusion; the seeds are used in the arts as a dye, and as colouring agent for butter; the supply at present, however, from Colonies like the West African, exceeds the demand.

Fruits are a very important culture in all tropical countries, and the indications point to the Shiré Highlands being suitable for raising the fruits of many diverse countries. The mango (*Mangifera indica*) grows with much luxuriance, but as all the existing plants at Zomba have been introduced recently they have not yet reached the fruiting stage. One tree is expected to yield some fruit this year. The same applies to oranges, avocado pear, and guavas, although at present one tree of the latter is maturing fruits. (On the Buchanan estate, close to the Residency, oranges bear with great profusion, and up till recently peaches were a great success there.) The granadilla (*Passiflora quadrangularis*) fruits freely, and the fig (*Ficus carica*) seems quite at home. The grape vine grows well, and is a recent introduction; we expect to see it fruiting next year. Bananas, it need hardly be remarked, bear with great abundance. Up to the present this is practically the only fruit the native grows.

Exotic timber trees are very promising. The red cedar (*Juniperus virginiana*) and West Indian cedar (*Cedrela odorata*) do extremely well, and are important in view of the expected development of the tobacco industry, as they supply material from which first-rate cigar boxes can be manufactured. Kauri pine (*Dammara Australis*), a timber of great value and utility, promises to become a great success here, for seedlings planted a year ago have reached over three feet in height. Mahogany does very well. The good offices of Kew have been requested in obtaining for us a large quantity of seeds in order that we can grow it on a considerable scale and distribute it over the Protectorate. The splendid Manje cedar (*Widdringtonia whytei*) grows with unexampled vigour at Zomba, which is at least 3000 feet lower than its native habitat. It is very interesting to find it doing so well here, and points to the fact that in time the hills of Nyasaland above the 3000 feet level can be successfully forested with this excellent timber. Seeds from the trees at Manje have been widely distributed amongst Government officers, missionaries, and planters in the Protectorate, as well as to various parts of Southern Africa.

Perhaps enough has been said to indicate the diversity of cultures possible in the Protectorate. The Botanical Department at Zomba is very young yet, but endeavours are being made to render it of service to the country. As it is, it can demonstrate that many plants of commercial importance find a suitable home in the soil and climate of Nyasaland.

#### THE IRON ORE DEPOSITS OF NORTHERN SWEDEN.

OF the excursions in connection with the last meeting of the Iron and Steel Institute in Sweden, none was of greater interest than the visit to the vast mountains of iron ore at Kiirunavaara and Luossavaara within the Arctic Circle. The party of members invited by the owners of the mines was necessarily limited, and the journey was long and arduous. After travelling 820 miles by railway, the party proceeded in carriages for forty miles over a loose shingle road, then for forty miles more up the Kalix river in boats poled against the stream, and lastly for ten miles on foot. The visit to the mines was made under the guidance of Mr. H. Lundbohm, of the Geological Survey of Sweden, who contributed to the meeting an interesting paper describing the deposits. From this the following details are derived:—

The character of the country is very remarkable. The Kiirunavaara mountain consists of a steep ridge extending for about 2½ miles, divided into a series of peaks varying in height from 270 to 2450 feet above the lake Luossajärvi, which separates it from the gently sloping conically shaped Luossavaara. On the tops of these mountains the ore lies almost entirely uncovered by soil; on the sides it is covered by morainic material and beds of gravel and sand; while the mountains are