NYASSA-LAND AND ITS COMMERCIAL POSSIBILITIES.[1]

THE rapidity with which the geography of Africa — the New World of the nineteenth century — has been opened up to the knowledge of Western civilization during the last forty years, has left very little to be filled in on our charts of the Dark Continent. As a natural sequence to the delineation of the strictly geographic features of the country comes the desire to know something of its climate, products, inhabitants, and resources. Added to the ever-increasing pressure caused by the increase in population, is that love of adventure which marks us as a nation, and leads the upper classes to speculate in travel, and the lower in emigration. Is Africa a suitable field for immigration? Does its vast area produce such articles as European civilization requires? Will its peoples and tribes buy our calicoes and manufactures, and have they any thing to offer us in return? These are the questions which have usurped the place of the vague wonder as to what lay in the unknown interior. We are concerned only with one comparatively small portion of this vast continent; and we deprecate criticism, *ab initio*, by saying that even of this portion we must speak largely by inference, analogy, and report.

By "Nyassa-Land" we include that country discovered by Livingstone, and the scene of his last wanderings and death. Roughly speaking, it is bounded on the north by the southern shores of Tanganyika and the borders of the Kongo Free State; on the west, by Lakes Bangweolo and Moero, and the Kongo Free State; on the south, by the Zambezi; and on the east, by the Shiré River, Lakes Shirwa, Nyassa, and Leopold.

Nyassa-Land has during the last year and a half come prominently into notice. Certain influential exponents of British thought and feeling have taken up once more the question of the slave-trade. The consensus of evidence of men so different in character and thought as Livingstone, Lavigerie, Cameron, Elton, Stanley, and Johnston, is not to be gainsaid, and British national feeling has once more proved itself on the side of the oppressed. It was generally agreed that Nyassa was one of the centres of the slave-trade. It had been, moreover, for many years the sphere of perhaps the strongest missionary effort in all Central Africa. Here for over twenty years the Universities' Mission had worked, and spent many thousands of pounds and many noble lives. Here for the last fourteen years the Scotch churches had been working with untiring zeal, founding some dozen stations; and closely following on these a trading company, in its origin largely philanthropic, and founded at first as a lay mission society, had established trading-centres along all the area occupied by the missions; while even private philanthropy had expended large sums in the construction of the "Stevenson" road, between Tanganyika and Nyassa. No wonder that those interested in the suppression of the slave-trade turned their attention to Nyassa-Land, discovered and exploited by British, and the centre of so many and such successful efforts by our countrymen for its good. By a strange coincidence, at the moment that the question of Nyassa began to assume such prominence as a centre of the slave-trade, and on account of the action of Portugal towards our missionaries and traders, and their hardly concealed threats of annexation, — at this same time a new prominence was given to the country by the news that the slave-traders had attacked one of the trading-stations on the lake, and that the British were fighting for their lives. The history of that siege, of which Consul O'Neill was the hero, reads like a page of fiction, — six white men, holding their own against an army of Arabs, utterly cut off from assistance, voluntarily remaining rather than haul down the British flag, slowly firing their last rounds of ammunition one by one! Had that story been told as was the story of Rorke's Drift, England would be aware that she had six new heroes.

It is our firm belief, that, for a country to be developed and civilized, any scheme set on foot must have a sound commercial and practical basis. This is the keynote of Sir John Kirk's creed, than whom no man has been more practically successful in Africa.

What, then, are the inducements offering for commercial enterprise in Nyassa-Land? Let us first view it from the standpoint we have already taken, the development of what has been already initiated in the past. The carrying-trade for the missions alone is sufficient, in our opinion, to pay dividends to a small company. Undoubtedly the route to Central Africa, the quickest, far the cheapest, the easiest, and healthiest, is by the waterway of the Zambezi, Shiré, and Nyassa, to Tanganyika. All the necessary supplies for the missions along this route, together with calico for their payments, should pass through the hands of the company on Nyassa, including the supplies of food and calico for those settled immediately around Tanganyika, both in the Kongo Free State on the west, and the numerous Arab settlements on the east; for around each mission station there grows up rapidly a desire for some of the rudimentary necessities of civilization. The ideas of decency and of cleanliness are encouraged by mission settlements, and thus the two first wants of calico and soap are rapidly developed. These, together with salt, a chronic savage want, and metal wire and beads for personal adornment, are essentially the pioneering elements, and indeed constitute the money of the country, for which the natives are willing not only to bring their produce, but to work by the week or month. These things, too, are largely required by the Arabs, and to a less degree by their followers; and, as they can be imported to the north of Nyassa at just about half the price which the Arabs can bring them for, a large trade might be done with these people, who are keen traders, and only too ready to see on which side their interest lies; while, if such commodities were supplied to them at the lowest prices compatible with small profit, the great extension of our trade would amply, we believe, cover the loss consequent on the reduction of present prices, while the prosecution of trade relations would tend to bring about a closer connection between them and the white men, and so to disarm the present feeling of mistrust and hostility. In return for these articles, we should get from the native chiefs (1) the entrée into the country, with ready permission to settle near them and so to exploit and develop the mineral wealth of the country; (2) in actual payment, ivory and such other local products as we shall speak of hereafter. From the Arabs we should get (1) we hope toleration, for we must ever bear in mind that at starting we should be utterly unable to cope with the united Arab power in these regions; (2) in actual payment, ivory, of which the Arabs are by far the best collectors. From the people themselves we shall get manual labor, porters for transport, and some minor products. The two former are the great desideratum for exploiting the country or working its minerals.

In this way the existence of the missions is a direct encouragement to trade. We have said that there is a constantly growing demand for calico and other trade goods. Let us as briefly as possible see what the country has to give us in return. One thing only, in our opinion, will pay for the initial expense of exploitation and the subsequent heavy transit expenses, and that is mineral wealth. We know for certain now that gold exists close to the lake shore. Years and years ago, alluvial gold, and also copper, were brought by the natives from Katanga. There is very good reason to believe that the gold-bearing quartz reefs south of the Zambezi extend probably from south-west to north-east through this district, towards Moero and Katanga. Asbestos has been found on the north-west shore, coal on the east, while iron and copper are worked by the natives themselves. We have, then, very fair grounds for believing that this country will repay by its mineral wealth the initial cost of exploitation. Its other products are in a sense valuable, but would not, in our own opinion, ever of themselves alone pay dividends to a large company. Of these, at present, the most important is ivory; but by far the greater part which finds its way from the interior is "dead ivory," i.e., tusks which have been kept for years, possibly for centuries, by chiefs in the far interior, who were ignorant of its value, and used it as ornamental door-posts, etc., and who now part with it to the Arab traders who have penetrated to their lands, in exchange for trade goods. This is, *ipso facto*, a decreasing product; and no less so, we think, is the "green" or newly killed ivory. Where only a year before large herds of elephants were to be met with daily, the writer has wearily followed tracks day by day without seeing a single elephant. The importation of guns and powder is responsible for this sad destruction. Native hunters shoot down remorselessly, not merely cows, but calves of any age, content to slaughter the latter to gorge on their flesh, if they have no tusks to extract; while the unfortunate

[1] Paper read by Capt. F. D. Lugard of the English Army, before the British Association at its recent meeting.

fact that the African cow-elephant carries tusks renders her, even in the eyes of European sportsmen, a legitimate prey, and the enhanced value of cow-ivory compensates for the lesser weight of her tusks as compared with the bull. Once more we would urge that the utmost endeavor be made to check this reckless slaughter. The writer has had charge of close on sixty government elephants in India for some considerable time, and again in Burmah, and may therefore claim, perhaps, to speak from some personal experience of the great services this animal, when domesticated, is capable of rendering. In a country where the horse, the ass, and the bullock — the two former imported at almost prohibitive expense — are all subject to destruction by the tsetse-fly, as well as the numerous diseases peculiar to a tropical country, the elephant, if domesticated, would be simply invaluable as a transport animal.

Second only, indeed, to the discovery of a payable export, is an efficient means of transport, to replace the slave-labor of the Arabs, and the expensive and unsatisfactory porterage which the white man has at present to employ. Of other products which, after development, would form payable exports, the most important is perhaps coffee. The coffee-shrub is, we believe, indigenous on the Zambezi. On the Shirê highlands it has been cultivated with the greatest success by Messrs. Buchanan at Lomba, the Lakes Company at Mandala, and the Mission at Blantyre. At these places very large areas are now planted with fine healthy coffee-shrubs, bearing well. Tea, we believe, has been lately experimented with, but so far we are unable to say with what result, though from the analogy of India we should predict a success. Cloves and cinchona-bark should also do well. All these, being of small bulk in comparison to their value, should be lucrative articles of export, and should grow equally well on the highlands between Nyassa and Tanganyika on the north, and Bangweolo and Moero on the west. From the lowlands we may add rubber as a payable export. Several kinds of rubber-vine grow profusely at the north of the lake. At present this trade is completely untouched.

In addition to these primary products, which need time for their development, there are a large number of minor ones, which, though we think that they would not in themselves offer adequate returns for money invested, would nevertheless materially lessen the initial expenses. The conveyance of European supplies, porters, arms and ammunition, building and other material to the north of the lake (at which place we would advocate a considerable depot), together with the ordinary mission carrying-trade, will necessitate the steamers going northwards with full cargoes. On their return journeys they could be loaded with some of the secondary, less valuable, and more bulky products which we are about to enumerate.

But, in our opinion, most of these are more valuable for local use and manufacture than for export, and by means of such an application of indigenous products the cost of stations in the interior might be largely reduced by the reduction of European supplies at present necessarily imported. A favorable instance of such is the Misanguti tree. This most picturesque of trees produces an incredible number of fig-shaped fruit-pods, each of which contains from four to six scarlet beans, and each bean is saturated with oil. They are used by the natives for food; and the oil, too, is extracted by boiling. When cool, this oil or fat is solid, even at a tolerably high temperature, and has the appearance of beeswax. It burns well as a night-light, and, mixed with beeswax (an easily obtainable local product), would have sufficient consistency to make candles, and thus save one article of present import. We believe, also, that it would make excellent soap; and it is not expecting much to assume that the potash and alkalies for this manufacture could be locally found. A certain quantity, indeed, could be obtained from the large quantities of wood-ash produced by the steamer-fuel. This would not only save the import of soap for consumption, but might even supply one of the staple articles of barter. The Misanguti, moreover, supplies from its bark a capital mahogany dye; and from the fact that the natives use it to dye their fishing-nets, and from the oily properties of the tree, it is presumable that it has very highly preservative properties. The wood of this tree is hard and valuable, and, as far as we could judge, its presence and shade were not injurious to vegetation, so that it might be largely cultivated in areas devoted to cereal crops. Lastly, we would suggest the experiment of an oil-cake made from its beans as a food for cattle and asses.

Another product of the country, at present almost wholly neglected, is hides. The Wa-Mambwa, Wa-nkande, and Angoni tribes possess enormous herds of cattle, and, except for the making of war-shields, the hides of these are little used. The hides of the buffalo, of which there are thousands in the plains at the north of the lake, being too heavy for this purpose, are entirely wasted. The great bulk of raw hides prohibits their export on the present small steamer, and would at any time be a serious detraction from their value as an export at such a distance from the coast. To obviate this, we would advocate the formation of crude tanning-pits, with the object of removing such portions as are unnecessary, and of softening the hides sufficiently to make them packable into a smaller bulk. One of the commonest trees in that district is the thorny acacia, called in India the Babul, in which country its roots and bark are largely used for tanning purposes. The forest, too, abounds with astringent fruits and berries; such as the Owlah (dear to sportsmen), and others of whose names we are ignorant. The collection and preparation of these hides would afford employment to those in inland stations; and these semi-tanned hides would largely assist in meeting local necessaries, such as camp-beds, tenting, or taking, in fact, to some extent, the place of waterproof sheeting. There are, moreover, many kinds of oil-seeds (such as the ground-nuts, etc.) and of dyes which would supply the return cargo for steamers. Of other European necessities, sugar is already manufactured at Lomba by Messrs. Buchanan, and its quality is improving yearly. Wheat, linseed, flax, cotton, and perhaps indigo, we think, could be grown on the highlands, and a fair substitute can be made for wheat-flour from the local grains. Of tea and coffee we have already spoken. Opium has been successfully cultivated at Mopea on the Kwakwa for many years, and under Mr. Addison's energetic management and improved methods the company has lately renewed its vitality. Butter and cheese can be made for local consumption in the cattle-producing districts. At present these European necessities are imported. Another valuable secondary product is fibre. From the coir fibre of the Borassus palm, to the soft down of the cotton-tree, the land produces endless fibre.

Acres, nay forests, of plantain surround every Nkonde village, and the plantain fibre rots on the ground. From this, and from the bark of various trees, the natives are very clever at making rope of every size, from twine to a cable, which they call *matusi*; but being prepared green, and without the fibre being properly separated and interwoven, it becomes brittle when dry, and does not last long. They make also baskets and very superior mats of plantain-fibre. There is, however, a species of hemp which grows very freely, and of which I am informed the fibre is singularly tough, which might form a valuable article of export in the form of tow. Doubtless investigation may bring to light many valuable drugs (the *Strophanthos* proved an El Dorado till the market was glutted); while among the many lovely plants (the wild gladioli and other bulbs, the gardenia-like flowering shrubs, the tree orchids and the ferns) many species may command a sale in the British market, and help to make capital, while the more extended schemes which are to produce the dividends of the future are being developed.

The timber on the highlands is small and of no great value; but in the lowlands there are several kinds of valuable timber-trees indigenous to the country, while ebony and other ornamental woods are, we believe, found on the Shiré. Many kinds of imported trees thrive excellently both on the highlands and at the level of the lake. Of these, the mango is doing well at Bandawe, and has grown for very many years on the Zambezi, imported by the Portuguese Jesuits: it is valuable both for its fruit and timber. The Neem, valuable for its oil and the medicinal properties of its bitter leaves, the blue gum and other eucalypti, the Gold Mohur tree, orange, lemon, and loquotz, also grow well, and prove that other trees growing in the same latitude and at the same altitude as those do in India would also thrive in Africa. Of such, the two great timber-trees, the teak and the Sal, would be worth introduction, as also the useful Mohwa tree; while, by the analogy of India, the oak and other timber-trees of England should do well on the higher plateaus.

In conclusion we will endeavor to answer the question as to the suitability of the country for immigration. The Shiré highlands, with their cold, bracing air, have proved by the test of many years to be well adapted to the conditions of European life. Scotch and English ladies have lived there in excellent health, and their children are robust and healthy. If this be so, we think that the still higher plateaus farther inland should prove healthy, and capable of producing the vegetables and other minor necessities of European life. But to attain these highlands, the malarious coast district must be passed through, and the graves of many ladies in this area prove its deadly influence. The first requisite, therefore, is a means of rapid conveyance from the coast, together with more fully developed means of accommodation and comfort. The opening-up of the navigation of the Zambezi from its mouth, thus establishing a direct communication with the sea-going steamers, would largely effect this, and the new steamer of the Lakes Company now put on the river leaves nothing to be desired for comfort. Enthusiasts may even picture the time when the railway — already projected — from the Cape shall be extended from Kimberley to the Zambezi, and so the malarious coast district be avoided altogether. But even the coast area itself has long been peopled by British Indian settlers, who have penetrated the whole length of the Kwakwa. The shores of the lake would be admirably suited for Indian immigration. We would, however, urge that such immigrants be drawn for northern India.

Nyassa-Land is a country, as Lord Salisbury recently said, discovered by British, opened up and to some extent civilized by us, and its possibilities we honestly believe to be great. Its climate is for the most part good, its scenery picturesque and enchanting. The time has come for its development and gradual civilization, and Britain must decide now or never, whether this opportunity is to be ours, or whether this land — historical in its past associations with the names of Livingstone and his many successors, and full of promise for the future — is to be ours, or to be left to the Arab slave-dealer for the present, and the fortuitous exploitation of some European nation in the further future.

HEALTH MATTERS.

Immunity and Immunization.

DR. H. BUCHNER has recently published a new study of this subject, and *The Sanitarium* gives the following *résumé* of it: Immunity in its full meaning signifies a condition of the body which permanently opposes the development of infectious processes; but there are conditions which act transiently in the same way against the danger of infection already existing. Buchner exemplifies this by a person attacked with typhus. In this case the disease, the continuous multiplication of bacilli, is not terminated before all tissues acquire transient immunity against the fungi. But what are the means by which the organism acquires immunity in a permanent or transitory way? To answer this question, Buchner first refers to Pasteur's protective inoculation, the actual efficiency of which is generally admitted at the present time. Buchner calls it a great triumph that it should be possible to immunize a living organism in this way without hurting its tissues.

Again, another means of immunization comes from France. Chamberland and Roux have injected intra-peritoneally the chemical substances of bacteria (ptomainia) in experiments on animals affected with malign œdema and with anthrax, without taking the bacteria themselves. The animals were actually rendered resistant to inoculation with living bacilli of the corresponding disease. This discovery is practically very important, inasmuch as the effects of chemical agents for the purpose of immunization are certainly more accurately measurable than those of living fungi. Theoretically the discoverers neglected drawing the necessary consequences from their results, and this has been done by Buchner with zealous energy. He prefaces his developments with a discussion of the means by which transitory immunity may be obtained. It might be possible to neutralize specific ptomaines in the organism by means of certain substances, just as Behring succeeded in decomposing the ptomaine of cholera-vibrios, cadaverine, by means of iodoform. Nature uses inflammation as an antidote against the invasion of fungi. Ten years ago Buchner pointed to this re-action of the organism by which it acquires transient immunity, but at the present day he disposes of proofs for his hypothesis. In a former paper, Buchner has described anthracic pneumonia produced by the inhalation of anthrax bacilli. Its symptoms are those of a sero-fibrinous hemorrhagic pneumonia. In the alveoli there is found an exudation abounding in cellules and an immense quantity of anthrax bacilli. On the other hand, the pulmonary capillaries and the larger vessels were absolutely devoid of bacilli, the spleen containing only a very few of them.

For the purpose of investigating the modus by which the agents of infection are arrested in their further invasion, Buchner has lately instituted some experiments, which led to the conclusion that "inflammatory re-action not only possesses the power of arresting the passage of bacteria through the pulmonary surface, but actually to cause degeneration of the infectious bacteria, and consequent destruction." It is not permitted here to give in detail the interesting experiments which Buchner, jointly with Dr. Schickhardt, has performed on animals infected with anthrax bacilli. The microscopical result confirmed Buchner's hypothesis that inflammation originates in consequence of the bacillus, but that conversely, once originated, it induces degeneration in the bacillus, and may doubtless cause its complete decay. The latter hypothesis is corroborated by the shapeless agglomerations of granules which are found, and which represent a transformation of the bacilli.

In accordance with the fact of an antibacterial, immunizing action of inflammation, Ribbert and Lahr have ascertained, after injecting staphylococcus avoreus into the trachea, that the local inflammation prevents the bacteria from penetrating into the organism, and subsequently causes them to degenerate and to die. Emmerich, and similarly Paulowski, have tried already to utilize these experiences in a practical way, — the former by his experiments with injection of erysipelas cocci in animals affected with anthrax, the latter by establishing the fact that even simple saprophytic fungi have a restraining curative influence on simultaneous anthracic infection. It may be possible in some other way, as tried already by Landerer by means of Peruvian balsam, to create in the organism a condition of excitation which might be used as a means of immunization. Through what kind of chemical and microscopical conditions an inflammatory excitation, or immunity acquired by protective inoculation, may act deleteriously on the bearers of infection, is explained on the results of Metschnikoff's well-known phagocytic theory. In Buchner's opinion, this theory constitutes one of the greatest additions to our morphological and physiological science of infectious processes.

Metschnikoff's doctrine, opposed from many sides, draws its principal importance from the fact of having demonstrated that viable, pathogenic bacteria may indeed be devoured by cellular elements. It explains how leucocystic and other cellular elements migrate into certain tissues in a condition of inflammatory excitation, and, exposed to infection, there display their phagocytic action. It is true, Buchner does not consider every thing explained by this process alone. On the contrary, a certain chemical reaction and concentration of the different tissue-fluids seems to be necessary for the debilitation and destruction of the fungi. Buchner, on the ground of experiment, is inclined to suppose the existence of fluid substances which, formed by the febrile process, have an antibacterial action.

This explanation being quite satisfactory for transient immunity, there are other processes to be considered in permanent immunity. Voit's experiments in Buchner's laboratory have recently furnished the proof that the organism possesses in the living blood-plasma chemical properties of this kind, deleterious for bacteria. Living blood, generally, is an unfit alimentary substratum, but by a change of its quality it may become a proper medium, and in this case a morbid affection of the organism would take place; the period of incubation would then be the time in which the blood is still possessed of those properties which arrest the bacteria in their growth, or possibly even destroy them. Immunity, then, would represent a permanent power of the organism to maintain the period of incubation. The question, in what way transition to actual morbidity is prevented, is answered by Buchner, availing himself of the experimental results obtained by Chamberland and Roux, by the suggestion that it is the adaptation of the organism to the spe-