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DESPATCH.

EAST AFR. PROT.

No. 15376

C.O. 15376 Reg. 30 APR 07

Governor.	No.
Jackson	134

1907

April 9

Last previous Paper.

C. 12708

Subsequent Paper.

15908

Dispatch to Gov 12/5/08 (?)

(Subject.)

Appln for Land
Colonel Owen Thomas

Trs copies reports by Acting Conservator of Forests, Surveyor, Mr Dowell of Agric. Dept & Mr Huff (?) Geologist on area of the land applied for.

(Minutes.)

Mr Read

These papers have been summarised in the telm which is in circulation with a draft to the Owen Thomas Syndicate.

You will see that Mr Battiscombe thinks there is very little of the land which is not of some value.

For this opinion however I don't believe in land being valueless unless the rainfall is insufficient or it is absolutely bare rock.

As for swamps they are far from valueless in their natural state tho many of them produce

mangroves which we command a
good sale and moreover the greater
part of the 100,000 tons of sugar
produced in B. Guiana is grown on
what was originally swamp several
feet below high water mark.
As an instance of the way in which
we are apt to be deceived in this
matter I may say that Mr
G. Williams a son of the Govr of
the Windwards informs me that
the land at Voi Kibwezi & Tsavo,
which we have been leasing out
in blocks of 50 & 100 sq. m. at low
rents on the supposed understanding
that it is only suited for fibre, is for
the most part perfectly fit for ordinary
tropical agriculture. He himself has
had to obtain a sub-lease from one
of these large concessionaires, who have
taken up all the land, a plot of 1000
acres on which he is growing Ceara
rubber to his satisfaction.
I have no doubt that almost the whole
of the Over[illegible]. Tsavo concession will
prove to be valuable land.

50 years [illegible]
now the [illegible]

WC 1/5

Mr Antrobus.
We are proposing to give [illegible] the first instance for
[illegible] our [illegible] [illegible] a lease [illegible] to the [illegible]
99 years; & it is probable that they will object to the [illegible] by [illegible] argument
[illegible] [illegible] we can support our position [illegible]
[illegible] H.B. 1/5

it cost money to reclaim
the swamps of B. Guiana,
and money will have to
be laid out to make this
land in E. East African
cost valuable

Wat. Mag 4

15376.

April 1907.

No.124

(Confidential)

My Lord,

With reference to Your Lordship's telegram of March 6th and to my telegram No.43 of the 3rd instant, I have the honour to transmit herewith copies of Reports by the Acting Conservator of Forests, Mr.Clarke, Surveyor, Mr.Powell of the Agricultural Department and Mr.Muff, Geologist, on the area at Aburcoast applied for by Colonel Owen Thomas.

I have the honour to be,

With the highest respect,

My Lord,

Your Lordship's most obedient,

Humble servant,

Acting Commissioner.

The Right Hon.ble

The H.M. Principal Secretary of State

for the Colonies,

Downing Street,

L O N D O N, S.W.

Montgomery Apr.3rd 07
Battiscombe Apr.2nd
Mr.Clarke Apr.10th 07
Mr.Powell
Mr.Muff Apr.10th 07

69/40. 206-15

ENCLOSURE No X

Despatch No 130 of Apl 9 1907.

Excellency,

The report of the Acting Conservator on the coast area south of Lumbwa has just been received, and I send it on at once, that it may be forwarded with the others to the Colonial Office.

It will be seen that Mr.Battiscombe takes a rather more favourable view of the area than either Mr.Powell or Mr.Clarke.

I have myself seen a good deal of the area, having been some way beyond Gozi, and I am inclined to agree in Mr.Powell's estimate that only about one third of the total area is really fit for cultivation of various sorts.

I doubt if cocoa nut palms of the paying kind can be so universally grown as Mr.Battiscombe thinks. The Dom palm is most common.

For these reasons I do not think any alteration is needed in the telegram I drafted; though of course this report should be forwarded with the others.

H. Montgomery

Commissioner for Land.

ENCLOSURE

In Despatch No. 3 of April 9 1907.

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Ld. 8/07

Forest Office.

Nairobi,

April 2nd, 1907.

Sir,

I have the honour to enclose a copy of a letter received from the Director of Surveys requesting me to report on the land applied for by Col. Owen Thomas on the Coast between the Uganda Railway and the German boundary.

As the time at my disposal was very short - 5 days - I was only able to march through the district and take notes of the vegetation etc. on my way.

Itinerary.

As I had on a previous occasion marched along the road from Mbaui to Shimoni by way of Gazi and Ramisi, I decided to go further inland and if possible march parallel to the Coast at a distance of ten (10) miles from it.

From Shimoni I proceeded North West towards Jombo Hill. I camped at Kubu's village to the North of Jombo and from thence I marched in two days to a village some 15 miles West of Vivi, when reaching it I proceeded to Mkomi and thence to Mombasa by the high road.

2.

Commissioner for Lands,

Nairobi.

The coral rock extends inland from the Coast at varying
nce of a few yards up to two miles, overlying the rock
oil is a fairly coarse sand the result of the dis-
gration of the rock, at Tiwi this soil is to be met with
ite two miles from the present beach, at Ozi it is absent
at Shimoni it extends some 1000 yards inland. The coral
is succeeded by a red soil with a fair admixture of
underlying this soil at varying depths is a stratum
probably impermeable clay; wherever this clay rises to near
the surface swamps are formed in the rains, and here and there
specially near Tiwi in large depressions lakes are formed which
not dry up.

The vegetation is rich and very varied and very local
thus affording a graphic means of estimating the extent
various soils in any locality. The three indigenous
palms e.g. the Doh Palm, Hyphaene coriacea; Borassus flabellifer
and Phoenix reclinata when seen in any quantity may be taken
as certain indications of the soil in which they are growing.

The Doh Palm thrives in the white sand overlying the
coral rock; Borassus flabellifer likes a fairly rich, not too
deep a soil, so that its tap root can reach the water overlying

the clay of the subsoil, Phoenix reclinata flourishes in shallow black soil immediately overlying the clay so that its roots can easily reach the surface water. Of course exceptions in isolated specimens of the palms may be met with, but where any one species is in a conspicuous majority the conditions of the soil above mentioned will be found to be prevailing.

On the slopes of the Shimba Hills where the soil is deep the vegetation consists chiefly of small trees with here and there near the margins of streams small groups of large trees. Of actual Forest there is but little within the ten mile zone, on the Shimba Hills there are small groups of from 500 to 700 acres a piece, but these would not be in the ten mile zone; according to the accounts of the natives there is forest on Jombo Hill, but it has not yet been visited or reported on.

Natural Products.

The chief natural products from the ten mile zone are Mangrove bark, Ebony, Gum Copal, small amounts of rubber, various timbers - all hard woods- and beeswax. Cheno has been found near Pongwe, a Vanilla has been found in the forests on the Shimba Hills, but the pod has not yet been found.

Mangrove swamps occupy a considerable extent of the foreshore, the three chief districts for mangrove are at Gazi, Funzi, and Pongwe, Gazi and Funzi are small areas but Pongwe is very large, from Funzi alone between 11 and 12 thousand tons of Mangrove bark have been collected this year, the market price of the bark in Mombasa is at present about Rs: 30 per ton.

Ebony - probably a species of Dalbergia - is found in large quantities on the slopes of the Shimba Hills, about 20 trees per acre would be fair estimate. The quality of this Ebony has been reported on most favourably by the Imperial Institute and would demand a ready sale if large pieces could be put on the market, unfortunately the majority of the big trees have been cut down by the natives and the existing trees are considerably damaged by fire annually.

Gum Copal trees are met with in the open fairly often say 5 trees per acre, but the best trees are found in the forests on the Shimba Hills; the present price of Copal is Rs: 14-30 per frasilla of 36 lbs.

A vigorous tree would be capable of producing at least 5 lbs. of gum a year.

Very little Landolphia Kirkii - the rubber vine - is found in the ten mile zone, though there are large quantities on the Shimba Hills; it is also reported to be found in large

quantities in the Vanga district, but this report has not been confirmed.

A new rubber producing tree has been found recently on the Shimba Hills, but the tree has not been seen within ten miles of the Coast, the rubber of this tree has been reported on favourably.

Of timber trees the most important are Mkongo (Albizzia sp.) Bombe Kofe, Mvuli, Mreha, Mpera mwitu, Mvule Mogal etc. All these are hard woods and the demand for such is limited.

Wild bees are very numerous especially near the Mangroves, a considerable quantity of beeswax could be collected.

Possibilities of land.

In my opinion the whole of the land of within the ten mile zone between Uganda Railway and German boundary is of very great value for planting purposes and is capable of yielding very good returns for money laid out on it.

The most important and at the same time the most paying crop would be cocoanuts. With the exception of swamps, all the land from the edge of the sea up to the Shimba Hills is capable of producing excellent cocoanuts, at present cocoanut palms are growing well all through the

district, although in nearly every case they have been damaged by being tapped for " tombo".

A cocoanut plantation after 8 years is capable of yielding a good return on the outlay, and in about 10 years should yield a very high profit; the price of Copra is steadily rising, and many industries could be established in connection with the produce derived from cocoanut palms.

In the swamps very good rice can be grown as is evidenced by the excellent crops obtained last season,1906.

For cotton the deep red soil is most suitable.

Among the many products grown by the natives in this district with success may be mentioned, Cassava; Sorghum saccharum; Maize; Ground nuts; Semsem; Sugar cane; tobacco.

In Col.Owen Thomas' application mention is made of Fibre and Rubber as being the two chief products to be grown in the district.

Sisal would no doubt do well on the deep red soil at the foot of the Shimba Hills, I do not think the shallow light sand would be suitable.

There is no indigenous rubber growing on this class of soil, the Landolphia Kirkii is met with in increasing quantity as one proceeds inland towards the hills.

Ceara rubber (Manihot glaziovii) would probably flourish on deep soil, Para rubber (Hevea brasiliensis) might succeed if planted in the valleys near water and where there is good shade. The Milk rubber tree (Funtumia elastica) would also do well wherever the Ceara would succeed. The newly found rubber producing tree which has not yet been named, grows in damp localities on the Shimba Hills, a few isolated trees have been found growing in dry and exposed situations, as it is not found nearer the Coast than the Shimba Hills I think it would not be wise to plant it in a locality where it could have spread to, had the locality been suited to it.

In Col. Owen Thomas' letter of the 18th April 1906 to H.M. Commissioner, he mentions that quite two thirds of the area of 350,000 acres applied for are unsuitable for cultivation of any kind owing to swamps, rocky, sandy and barren land. I think that this statement should be accepted with considerable reserve as the whole of the land with the exception of the swamps is capable of growing coccanuts, the crop derived from trees growing on dry shallow sand would naturally not be so good as that obtained from trees growing on richer soil; in the swamps rice can be grown.

I have, etc. etc.

E. Battiscombe

Acting Conservator of Forests.

II.

SURVEYOR'S WRITTEN REPORT.

SURVEYOR'S REPORT
UPON AREA of 547 SQUARE MILES
APPLIED FOR by COL. OWEN THOMAS
IN THE VANGA DISTRICT OF SEYIDIE PROVINCE.

The area applied for is described as 350,000 acres (or 574 square miles) situated along the Coast between Ras Muaka Senge and the German boundary, and seems to apply to the 10 mile Coast strip.

As the back portion of the Coast strip bounding the Uganda Railway is mostly private land, the North boundary of the strip applied for would be from Ras Muaka Senge along the shores of Kilindini Harbour to Port Reitz, along the shores of Port Reitz to the Westerly end to the River Duruma, which would complete the Northern Boundary.

The South boundary would be the boundary line between the Protectorate and German territory.

The Eastern boundary, the sea.

The Western boundary, a line drawn from a point ten miles inland along the German boundary, crossing the Mchongo, Umba and Mwene rivers, passing over Malenge Hill and Marima Hill, passing immediately to the East of Kiruko Hill, afterwards turning slightly to the North and crossing the

(Remai

12.

Ramisi and Mwele rivers, and passing near the village of Mwele on to the side of the Shimba Range of hills, crossing the Pemba stream, to the river Duruma near the head of Port Reitz.

In this area are included the following special areas:-

			Square Miles.
1.	Portion of Mombasa Township area ...	About	4
2.	Vanga Township area	"	6
3.	Mr. A.G.W. Anderson, at Ramisi river (50 years' lease from 1904)	"	1·56
4.	Mr. C. Anderson, Funzi foreshore (5 years from 1904) ...	Estimated	6
5.	Mr. C. Anderson, Pongwe foreshore (4 years from 1905)	"	10
6.	Mr. C. Anderson, Gazi foreshore (5 years from 1904)	"	8
			35·56
7.	Also portion of Forest Concession to MacAllister and Diespecker	Say	51
			86·56

Say Total, 87 square miles.

Mr. C. Anderson had a rubber concession of 25 square miles for one year from 1905.

The area applied for ... 547 sq. miles.

Special areas ... ... 87 sq. miles.

Reduced area, 460 sq. miles.

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The extra land to make up 547 square miles can be obtained by a strip about 6 miles wide, between the German boundary and Jombo Hill, the strip running parallel with the coast.

Record of the rainfall is made at the Shimoni station and at Mombasa. These places are on the Coast, and perhaps do not afford a true estimation of the inland rainfall. At both places a very good rainfall is recorded; at Mombasa the average for 13 years seems to be 49·1 inches, and at Shimoni for 9 years, 55·5 inches.

In going through the district, one cannot help noticing in a very large part the fresh green appearance of the grass; this especially applies to the inland parts. Going along the coast, water is met with at six places between Ras Muaka Songe and Gazi, three fairly large streams being crossed; after passing Gazi four good streams are crossed. This was during the dry season; during the rains many dry streams would be running with water. Going from the Juba River to Ras Muaka Songe, at an average distance of 5½ miles from the Coast, fourteen running streams were crossed, some of them of good size, and in addition a few places were passed where there was standing water, and some places which were slightly swampy. As the observations were taken during the dry season, the district would seem to be fairly well watered.

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The Shimba watershed, I understand, is especially reported as sufficient for the Mombasa Water Supply, but looking to future requirements it would require to be completely reserved for that purpose. Portion of the storm water flow would no doubt be available for other purposes, but if any large constant amount had to be withdrawn, the alternative proposed scheme, viz., the Tsavo-Sabaki river supply for Mombasa, would require to be undertaken.

Exclusive of Mombasa Island harbours, the only suitable harbour seems to be at Shimoni; in the channel between it and Wassein Island is a very good natural harbour. The other ports, Gazi and Vanga, are tidal, and would only admit small vessels at high water. At Vanga a concrete sea embankment has been formed, which allows small boats being brought alongside.

Most of the coast from between Tiwi and Gazi to the German boundary is formed of low swampy land (excepting the coast at and near Shimoni), and most of this is mangrove swamp, the mangrove trees being of good size.

There are, I understand, no large fishing concessions on the coast; only certain short-period rights for collection of pearls, etc.

The native population, throughout the area, (is

is not large, and labour will be the chief difficulty to contend with in developing the land. A rough estimate of the population would be 7,000 natives. The area they cultivate might be taken at a thirtieth or fortieth part.

The land between Ras Muaka Senge towards Tiwi is light, sandy soil, thin, with rock at places. The country is open, with few shambas. There are a good many cocoanut trees and mangoes on the portion near Kilindini Harbour channel.

Towards Tiwi the soil improves. There is cotton growing at two places near the road to Tiwi, but it seems to be small.

The land round Tiwi is alluvial in character. There is a large lake near, where some rice is grown. There are also cocoanuts and mangoes.

Between Tiwi and Gazi to Ramisi the soil is light sandy. There is a fair amount of native cultivation. The land is rather rough and rocky near Gazi, and the road then traverses some mangoe swamp, afterwards rising into Gazi, which stands high.

The land near Ramisi is of a heavy nature, by beyond the river becoming lighter again. The soil also is very much better, and continues to improve, down to the German boundary.

The district along the Jube River is, I think,

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the best part, and Vanga rice is cultivated; further inland the land rises, the soil being of a loamy character.

From Mandoa to Malanga Hill and on to Tiwi, the soil generally is of a light character; cocoanuts seems to grow very well, and rubber is collected in parts, specimens being obtained at M'donda near Kiruko and at Mkrumoge; at the former vine, at the latter tree.

On the higher ground and hills the red soil is general.

There is little wood which could be classed as forest, except at Malenge, Marima and Kiruko hills, which were thickly wooded; generally also along the banks of rivers and streams there are trees of good size.

The climate seems to be fairly good; only at Ramisi River, near the coast, were mosquitoes troublesome. At other places, except at Vanga, they were very scarce. Possibly during and after the wet season the district may not be so free of them. The heat is very trying; near the Juba river the nights are fairly cold, other parts being similar to Mombasa.

(Signed) J. PERCIVAL CLARK.

Mombasa,
20th March, 1907.

III.

DIRECTOR OF AGRICULTURE'S REPORT.

Extract from Mr. Powell's report on his Safari Mombasa to Vanga

I left Mombasa for Vanga on the 11th April. The same evening I camped by the side of the first stream met with, about 2 miles beyond Tiwi. After crossing the ford at Kilindini there are numerous cocoanut trees, all more or less tapped for tembo. Native shambas are also seen. This belt is soon passed and for the rest of the journey to Tiwi little is done in the way of cultivation. The chief vegetation is the Doum palm with an occasional clump of mango and cocoa-nut trees. The soil is a light sandy loam out of which crop numerous stones of a coralliferous nature.

Owing to the lack of water it is difficult to recommend any cultivation for the greater part of the country between Kilindini and Tiwi. At the latter place the soil is very sandy and cocoa-nut palms thrive. These could be largely increased. Date palms will also probably succeed here. There is a fair attempt at cultivation, such crops as cassava; pigeon pea; sweet potatoes; native beans, etc. doing well. Near the Tiwi River the vegetation is of a rank nature and speaking generally the soil is good and the rainfall apparently plentiful. Such cultivation as cotton and sisal hemp would succeed. Good grazing is available and fair numbers of goats and sheep were seen.

The country between the Tiwi river and the river which flows through the mangrove swamp near Gazi is practically waterless. At Gazi itself there are groves of cocoa-nut palms and the usual native shambas. Sisal hemp would succeed admirably and I am of opinion that

(cotton

cotton would do well if planted early enough-say about the end of March or the first week in April.

On the Tiwi side immediately adjoining Gazi is a considerable area of land where cotton should be given a trial.

From Gazi to Ramisi the country generally has a better vegetation than that previously passed through. For the first part of the journey several large mangrove swamps are crossed by means of raised causeways and bridges. At Ramisi, Mr. Charles Anderson had experimented, the previous season with a field of cotton several acres in extent. It had not proved a success and I was not surprised thereat. The situation is not nearly so good as other places seen in the district; the land had not been properly cleared of palm trees and scrub; the plants had not been thinned, as many as six being counted in several holes, casually noticed and weeding could not have been done more than once or certainly twice.

A plot of vanilla was growing nicely and is deserving of extension. I understand from Mr. Anderson that he intends planting more.

This has also been experimented with; the plant grows well but it is difficult to cure in the damp climate. I do not regard Ramisi as a tobacco country.

In the neighbourhood of the Ramisi river it is highly probable that Fontumia would grow well. The country is very sparsely peopled and the question of labour comes up again.

The country between Ramisi and Shimoni is from the point of view of vegetation far superior to any

(yet

yet passed through. There is evidence of a good rainfall so that it is safe to recommend rubber cultivation, both Funtumia and Castillos. A large area of land appears well adapted for cotton cultivation as well as sisal and other fibres. Immediately at the back of Shimoni is an extensive forest thickly timbered.

The Government cotton shamba is located at a place known as "Kibana". An experiment had been conducted here last season and arrangements had been made for a further trial.

If the cotton should succeed in this locality there is a very large extent of good land available, similar to that at the cotton shamba.

Many padi or rice fields of several acres in extent each, are planted near Kibana, and a little cultivation of maize, etc. is attempted.

Cocoa-nuts do very well at Kibana; there is room for many more.

The soil is a rich grey sandy loam, in which by proper cultivation splendid crops of native vegetables could be grown.

I proceeded to Vanga by boat from Shimoni on the 18th April. Overland the journey takes about 8 hours but by boat only 2½ hours.

Near the experimental cotton shamba at Vanga I inspected a small sugar factory. The mill is of the "Chatanooga" type with vertical rollers. It is worked by 4 to 6 men with levers after the manner of a cattle mill. The method of treating the juice (is

is similar to that known in the West Indies as "open pan" or "muscavado". The sugar canes were excellent as regards length and size, but were somewhat deficient of sweetness. The latter is due to neglect of stripping off the dry leaves or trash on the growing canes and a lack of weeding in the shamba. I visited the cane-field and was surprised to learn that the canes are allowed to grow for 15 years in succession without being replanted.

With proper cultivation and manufacture sugar canes prove remunerative in parts of the district. Large number of sugar canes are exported to Zanzibar.

Copra is also prepared at Vanga and exported in quantity to Zanzibar. The process of preparation is a simple one. The nuts must be dry or mature before being husked; they are then cut or broken in two-crosswise- and the copra is scooped out by boys with a knife. It is then placed in the sun for a day or two until it assumes a dark brown colour, and is then ready for export.

As already stated rice is extensively grown at Vanga. The crop takes six months to mature and many plots were ripening during the time of my visit there. Birds were giving a lot of trouble and needed a watcher at each plot.

I took advantage of my stay at Vanga to visit the sisal hemp plantations and factory belonging to the German East Africa Coy., at Moa. A full report on this visit, with the information gained, has already been submitted to you, Leaflet No.6.

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I returned to Mombasa by the same way I had gone. The heavy rains were now falling and much of the country was flooded by rain-water.

(signed) H. Powell.

Summary.

(a) At Kilindini Ford are numerous cocoa-nut trees and room for many more. Native shambas are also located here. The soil is good and native crops do well.

(b) Between Kilindini and Tiwi the soil is mostly poor and stony and for a large part of the year of a dry nature. There are spots where cocoanut trees do well and these could be extended. Sisal hemp should succeed over a large part of this land.

(c) At Tiwi the soil is sandy and cocoa-nuts thrive. This palm could be more freely grown here. Native shambas contain cassava; pigeon pea; sweet potatoes; beans, etc., all of which do well. Cotton and Sisal hemp would succeed in the neighbourhood of Tiwi. Good grazing is available.

(d) The district of Gazi is a good one and contains numerous cocoa-nut trees in good health and bearing condition and could be greatly increased. Sisal hemp would do well, also cotton. Native shambas are numerous and the soil is good.

(e) The country between Gazi and Ramisi has a better vegetation than yet passed through and contains several mangrove swamps. The district of Ramisi, especially on either side of the river, has a good vegetation and rich soil. It is probable that Funtumia elastica (Uganda tree rubber) also Para Rubber and many other valuable tree cultivations, would succeed here.

(f) The best country on this coastboard is that between Ramisi and Shimoni. The general vegetation

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and soil is good and rainfall apparently plentiful, various rubbers, cotton, sisal hemp, etc. would do well. Cocoanuts thrive at a place called "Kibana" in the Pongwe district and there is much land for extending this valuable palm.

(g) The forest at the back of Shimoni Collectorate is apparently extensive and of considerable value.

(h) The visit to Vanga was done both ways by boat, so that the country between Shimoni and Vanga was not inspected. It could be seen however, to contain a considerable area of mangrove swamps.

(i) Rice is fairly extensively grown at Vanga, also cocoanuts, and small patches of sugar cane, in addition to the usual native shambas.

The following is considered a fair classification of the land comprised within the 10 mile strip.

(1) One third of area containing, or suitable for, various cultivations.

(2) One third -do- -do- forest, mangrove swamps or low trees.

(3) One third -do- -do- barren or practically useless.

Rainfall returns of Shimoni attached.

(signed) H. Powell.

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SHIMONI.

Rainfall. 1906.

January.	1.54
February	3.01
March	2.60
April	16.81
May	18.21
June	9.24
July	2.33
August	0.90
September	2.57
October	1.70
November	4.93
December	0.30

ORIGINAL

INCLOSURE No 5

In Despatch No [illegible] dated [illegible] 1907

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IV.

GOVERNMENT GEOLOGIST'S REPORT.

Voi, February 20th. 1906.

From,

H. B. Muff. Geologist.

To,

The Loco Superintendent,
Uganda Railway- NAIROBI.

Sir,

I have the honour to inform you that in my examination of the rocks in the neighbourhood of the railway from mile 30 to the Makupa Bridge, I found that the country could be divided into two tracts by a line running nearly north-east and south-west and crossing the railway about mile 11/6. On the north-east side of this line lies the higher ground consisting of fine and coarse-grained sandstones, which are found in thick beds separated by shales. To the south-east of the above mentioned line, the country is relatively low lying and consists of dull olive-green shales(Changamwe Shales).

The sandstones from mile 30 to mile 18 are soft and yellowish in colour. They contain more or less mica, which causes them to split too readily along the bedding planes to make a good freestone, whilst their softness prevents them making either good flagstones or stone-slates. From near mile 17 to Mazeras, the sandstones are generally harder and afford a better stone. Between miles 15½ and 11½(e.g. at mile 12/3) are some thick beds of white or yellowish sandstone, which would afford a fairly good freestone for building purposes

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The shales exposed between mile 30 and Mazeras are sandy and micaceous; whilst those occurring between Mazeras and mile 11/6 are more clayey or marly, and vary in colour from pale green to dark green or purple.

Near the boundary between the beds described above and the Changamwe shales are two beds of limestone, the outcrops of which, so far as they have been traced, are shown on the accompanying sketch map.

The first of these is a band 25 to 30 feet thick, the various beds of which vary somewhat in character. The greater part of it has an oolitic or pisolitic structure and contains a proportion of sand-grains and even lumps of sandstone. Specimens A. are from this band. The limestone forms a conspicuous cliff on the right bank of the estuary of the Mwachi River. The cliff is easily accessible by boat (and probably by large dhow) even at low tide. On the left bank of the river, the limestone is found a little further north where it is overlain and underlain by thick beds of sandstone. The bed rises to N.N.E. at an angle of 15° and soon reaches the top of the hill to the south of the big horse-shoe bend of the Mwachi River, which is seen from the railway at mile 11/16. Here the limestone spreads out along the crest of the hill, its outcrop measuring 150 yards from N to S. On approaching the eastern end of the hill, its outcrop is shifted by faults and has not been followed out.

The second limestone is a bluish-gray hard compact limestone, probably not half as thick as the

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the first bed. Specimen is from this band. It contains as impurity a proportion of very fine sand-grains and cannot be expected, therefore, to yield a hydraulic lime. This limestone is found on the left bank of the estuary of the Mwachi River to the south of the outcrop of the first limestone.

From here the outcrop (apparently shifted by faults) runs inland in a north-easterly direction. The best outcrop occurs at a locality situated on the northern flank of the first hill south of mile 11/13 (roughly ½ mile). In the event of this limestone being worked, the above locality is easily approachable from 11/6.

Outcrops of limestone were observed on the native track which runs in a N.W. direction in the angle between the railway and the track of the old Mazeras tram-line at mile 10/4. In one case the lime-stone is probably too thin, in the other too impure to have any economic value.

From mile 11/5 to the Makupa Bridge the cuttings on the railway expose the Changamwe Shales. These are dull olive-green shales, a sample of which has been secured for experimental brick-making. Thesebeds contain clay-ironstone nodules, sometimes in some abundance. They also contain nodules of clayey limestone, which might yield a lime with hydraulic properties. The nodules are, however, never found in any quantity, but should they give a valuable lime the nodules will be found in greatest abundance at the foot of the

(bluffs

of Port Reitz and Port Tudor and also in the mouths of some of the nullahs such as that entering the estuary of the River Mwachi to the south of the second limestone.

The general structure of this district is similar to that of the country to the west. The inclination of the beds is on the whole towards the east so that newer beds are met with in that direction. Between Mazeras and mile 11½, however, the dip of the beds often has a westerly direction, but several faults trending in a N.E. -S W direction throw the beds down towards the east and the sandstones finally pass eastwards beneath the Changamwe Shales.

The Mazeras sandstones are pervious to water, but as the rains are of the usual tropical character it is probable that only a very small proportion of the total rainfall percolates into the sandstones.

In the deeply eroded valley of the Mwachi River a small quantity of water issues near high water mark from the sandstones where they pass beneath the Changamwe Shales. It is evident that the water-table of the sandstones, at this period of the year at any rate is very little above high water mark.

The Changamwe shales are impervious to water. The rains are carried off at once to the sea by the numerous short and deep valleys or are lost by evaporation. In this connection it may be noted that areas occupied by the Changamwe shales have practically no soil and are never cultivated. The tracts of cultivation around Changamwe are strictly limited to areas where the shales are covered by a reddish loam which easily

easily absorbs water.

A deep boring put down on Mombasa Island would after piercing the coral limestone or Kilindini sands at no great depth below sea-level, pass through the Changamwe Shales and enter the Mazeras sandstones. Water from these sandstones, would rise in the borehole, but the head of water is evidently not sufficient in this district to form an artesian well.

The depth to which such a boring would have to be carried depends largely on the thickness of the Changamwe Shales. I regret that I have found it impossible to make such an estimate. The general impression gained from the cuttings, which show dips varying from 5° to 25°, is that the shales are of immense thickness. Owing to the uniformity of the beds it is impossible to make allowance for the effects of faulting and folding seen in the cuttings between the Makupa Bridge and Changamwe. Again, for five miles (Changamwe to mile 9) the shales are not exposed along the line and the bluffs of Port Tudor and Port Reitz, whilst sufficient to prove the continuity of the shales, are too overgrown to give information as to the thickness of the beds. From mile 9 to the top of the Mazeras sandstones the beds are not greatly disturbed and there may be as much as 2,000 feet of shales. It is evident that a boring put down on Mombasa Island might have to pierce a great thickness of shales. The careful collection and identification of fossils might show to what extent the beds are

repeated

repeated at the surface.

The fact that the Mwachi and other rivers, which flow over the outcrop of the Mazeras sandstones, are brackish, does not necessarily imply that the water obtained from a deep boring on Mombasa Island would also be brackish.

I have the honour to be,

Sir,

Your obedient servant,

(sd) H. Brantwood Muff,

Geologist to Uganda Railway.