1532

Reynolds & Co
Lucas

1914

26 June

Last previous Paper.
Gen File
114

Visit to Soudan

Submits report.

Sir G. Fiddes

Here are 3 copies of the Report. You will find the illustrated one at the top.

There is a great deal of interesting matter in the latter portion of the report which deals with wild life & important branches of the development of the other industries of the Protectorate.

Lord Harcourt has not as yet read the Report but I have read with much interest & took a copy of the Report with copy of our reply & the illustrated copy of the Report to the Private Secretary of the Duke of Devonshire

Copy Report Gen 654
Gen 654
Gen Report Gen 24 288 16 Jul 14

Last subsequent Paper.

(A1426) Wt.47/286—13. 45,000. 12/13. A & E W.

of papers called for the formal motion
& saying that a copy of the Report has
also been sent to Uganda - & send
one of the plain copies & Uganda mss.
the other of the ~~copy~~ Report which can be sent
to the S.S.P. ~~& we can~~
for a space of by post

H. J. R.

3/VII/14

Rec'd 7.14

S. T.

44 Holland Park Avenue
London W.
14/7/14

RECEIVED
14 JUL 14
COL. OFFICE

164

Sir, In reply to your 23011/1914 I have the honour to inform you that the copy of my report, which you ask for in para 2, will be sent on in the course of a few days.

I have the honour to be,
Sir,
Your obedient servt
T. Kitchener

Downing Street,

24 June, 1914.

Sir,

In reference to letter No.168 dated 19th February, 1914, from His Excellency the Governor, East Africa Protectorate, Nairobi, to The Secretary of State for the Colonies, London, dealing with my proposed visit to the Soudan for the purpose of enquiring into the methods of sudd cutting as practised in the Soudan, I have the honour to submit the following report.

2. I have not confined my report to sudd cutting but have made various notes regarding the Railway and Soudan Steamers Department which will probably be of interest to the Uganda Railway.

3. For the same reason details of Receipts and Expenditure have been given of (a) Harbour Department, Port Soudan, (b) Wady-halfa-Shellal steamer service and (c) Soudan Steamer Department [illegible] may be of interest to compare [illegible] receipts and expenditure, in order to see what proportion they bear to each other in relation to the receipts and expenditure of our own steamer service.

I have the honour to be

Your obedient servant,

Marine Superintendent,
Uganda Railway.

THE SECRETARY OF STATE
FOR THE COLONIES,
DOWNING STREET, LONDON, S.W.

R
28011 Sep

166

9 July 95

Sir

I am to ask the
receipt of your letter of the
Lieut. Col. Reynolds Rad. 26th of June, forwarding
copies of your report on your
recent visit to the Sudan,
which he has read with
much interest.

DRAFT.

MINUTE.

Mr. Hotchkis
Mr. Read
Sir G. Fiddes.
Sir H. Just.
Sir J. Anderson.
Lord Enmott.
Mr. Harcourt.

2. A copy of the report
has been forwarded to the
Sec. of the Treas. together with
a copy, with maps & other
enclosures, for communication
to the General Manager of the
Uganda Railway. A copy is
also being sent to the Sec. of
the Uganda [illegible] I am to
request you to be good enough
to furnish a further copy
for record in this Office.

I am

Copy sent 6324 10/7/95

FOR THE SECRETARY OF STATE

Sir

10 July 18

Sir

With reference to my dd. 7 the 7th. inst. I have the honour to transmit to you herewith the accompanying Copies of Correspondence with Lieut. Col. Reynolds, relative to the Uganda Railway Survey, on the subject of his report on his recent visit to the Sudan.

2. A Copy of Lieut. Reynolds' report is enclosed for your information, and a copy, with maps, etc., for transmission to the Secretary of State for the Colonies.

A copy is also being forwarded to the Governor of Uganda.

I have &c.

(Signed) C. EUSTACE.

The Officer Commanding

8

8 July 18

Uganda No 4 & 8

The Ogs

Copy by
Mr Read

1

I have the honour
transmit to you, for the
with the accompanying
report by Lieut Rtn.
Reynolds R.A. Supt
Uganda Rly Survey
his recent visit to

2. A copy of the report
has been sent to the Sec. of the
Exch.

I

[illegible] on a visit to the Soudan for the purpose of enquiring into the methods of clearing [illegible] and of the organisation of the steamer [illegible] etc.

Llanstephan Castle.

I embarked in this steamer at Kilindini on April 20th. There were two features on board this ship which occurred to me might possibly be useful in connection with our proposed new passenger steamer.

Thermo system of cool air.

One of these was the system of circulating the air in the saloons and cabins but in spite of this circulation both cabins and saloons were unbearably hot at times and it appeared that the chief benefit derived was the maintenance of a supply of pure, but not necessarily, cool air. The system of trunks, etc., in connection with the installation appeared cumbersome and occupied a considerable amount of space although the size of the plant would presumably vary according to the size of the ship.

In the last plan submitted by the consulting engineers for our proposed new passenger

passenger steamer the saloon ports are so near the water line that it is doubtful whether it will be possible to open them excepting at such times as the vessel is stationary and in such circumstances it will be necessary to adopt some form of ventilation as just described. This point should be referred to the consulting engineers.

Bibby system. This system admits of a port hole to each cabin so that there are no cabins without port holes. As our existing cabin accommodation is arranged every one is provided with a port hole and with the ships constructed as they are at present room does not admit of inner cabins. This might not apply to a larger steamer with more beam and built primarily for a passenger service; this system when of providing port holes for inner cabins should be borne in mind when plans for the new steamer are being made.

Port Soudan. We arrived at Port Soudan at noon on April 29th and was compelled to remain there until April 30th for a train. The port is up-to-date and well-equipped with modern appliances. The quay is fitted with electrically driven capstans and there are 4-3 ton and 1-7 ton electric cranes. There is also a 25 ton floating crane.

The coal transporter can handle 1000 to 1200 tons a day; either buckets or grabs can be

be used but the use of the latter has been discontinued as it was found to break the coal up.

Coal is only stacked to a height of six feet and I was informed that when it was stacked higher fire sometimes broke out owing to spontaneous combustion caused either through the extreme humidity of the air or by the damp rising up through the made up ground on which it was stacked.

Coal is delivered on the quay at about 27s.6d. per ton.

The cargo sheds are placed too far back from the edge of the quay and consequently the cranes cannot pick up or deposit cargo near them which necessitates extra handling.

The sheds are provided with Avery weigh-bridges of 4000 lbs. capacity and these might be introduced with advantage at Alexandria and some of the larger lake ports.

Dockyard. This is well-equipped with a slipway, electrically driven machinery and a large foundry. In addition to repairs of Government vessels outside work is undertaken. Labour is expensive and skilled carpenters and mechanics are paid about £8 a month.

Steamers. There are numerous launches, lighters, boats and a tug which latter acts as pilot-tender

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Steamers. There are numerous launches, lighters, boats and a tug which latter acts as pilot-tender

pilot-tender and tows pilot-boats to and from ships. Pilot fees are compulsory. In addition to these craft there is the "Enterprise" a very fine sea-going tug. She originally belonged to a firm of English tug-owners and from them was purchased by a man who partially converted her into a yacht without, however, detracting from her utility as a tug. She is used for salvage work and for general work in connection with the harbour and inspection on outlying reefs of beacons, buoys, etc.

She was bought by the Soudan Government for £8,000.

Control of the Work. The entire control of the Port including pilotage, buoyage, light-houses, and all harbour work, which was formerly a part of the Soudan Steamers Department, has recently been absorbed by the Railway, and there is no doubt that in a port which is served by one railway the interests of the railway and port are so identical that it tends to efficiency and economy to have one central control.

It is essential, of course, in order to exercise efficient control of the harbour to place it in the charge of an executive officer from the Royal Navy or Royal Naval Reserve, who is directly responsible to the General Manager.

With the certainty before us that in the not far distant future we shall have a large harbour at Kilindini, I considered it would be

of

of advantage to give in some detail the principal items of revenue and expenditure for 1913, before the harbour was taken over by the Railway, as some idea will be gained by their perusal of the source of receipts and the various headings under which expenditure is incurred.

The estimated expenditure for 1913 was £24,506 and receipts £18,710.

It should be noted that the minimum pay of Englishmen is £240 per annum and that most of the higher paid artisans are either Italians or Greeks; the Egyptian I was informed does not as a rule make a good artisan.

The item of £2,082 for Departmental Craft is hardly a fair charge against the harbour as it is on account of the up-keep of craft used by other departments but maintained by the Port Department. Although it is unlikely that Kilindini will ever require a ship as large as the "Enterprise" I give a list of the crew and their pay as the rates are probably approximate to those that would obtain at Kilindini. The engineers are Greeks and are quite satisfactory; when the ship is in harbour for any length of time they work in the shops. English engineers would probably object to this.

The salaries given are those actually drawn and I am not aware of what the various scales are.

The pilots bring the vessels in and out

out of harbour and also moor ships alongside the quays.

Electric power is supplied by the Public Works Department.

All officers drawing less than £420 per annum are classed as Juniors, a class similar to our subordinate staff.

Public Executive Staff.

1 Controller	1,000
1 Assistant Controller	600
1 Harbour Master	900
Clerks and Messengers	8

Dockyard Staff.

1 Engineer of Dockyard	540
1 Assistant	330
2 Fitters	240
2 Boilermakers	288
1 Electrical fitter	132
2 Blacksmiths	252
1 Moulder	180
1 Foreman carpenter	132
1 Boatbuilder	120
Clerks, Foremen, etc.	436
Artisans, &c. Labour	1,200

Pilotage, &c.

1 Chief Pilot	276
1 Pilot	240

5 Signalmen

5 Signalmen	£120
1 Chief Lighthouse Keeper	228
1 Assistant "	108
7 Light attendants	252

Quays and cranes.

1 Superintendent of Quays	330
1 " Machinery	360
1 Assistant "	300
1 Fitter	126
8 Drivers	720
2 Leading Drivers	216
Greasers, sailors, messengers, etc.	570

Harbour Police.

1 Native Officer	180
5 Non-commissioned Officers	123
20 Policemen	360

Departmental craft.

Various ratings	2,082

Harbour Craft.

1 Engineer	192
1 "	108
3 "	216
9 Coxswains from £24 per annum to £72 per annum.	390
34 Firemen, sailors and lighter men	900

S.S. "Enterprise".

1 Captain	324
1 Chief Officer	240
1 Second "	240

1 Boatswain

1 Boatswain	96
1 Chief Quartermaster	72
3 Quartermasters	126
1 Sailors	252
1 Carpenter	72
1 Chief Engineer	276
1 Second "	216
1 Third "	120
10 Stokers	378

Maintenance &c.

Fuel	550
Materials	1,500
Clothing, Sailors and Police	384
Electric power for Dockyard	420
Upkeep of "Enterprise" fuel, maintenance, etc.	1,035
Upkeep of Lights and Signal station	240
Postage, telegrams, printing, etc.	175
Transport	200
Upkeep buoys and bar	150
Electric power for quay equipment	1,800
Electric lighting of quays	250
Fresh water for shipping	285
Upkeep Quay machinery	200
Various	113
	£24,505

Total

Hotel and catering. There is a small but well furnished and comfortable hotel capable of accommodating 32 visitors. It is owned and managed by the Railway and forms a branch of the Catering Department. The inclusive charges per diem are about 21.... and there is a reduction on these, and also on all dining car charges, of 4... for Railway officials and 25 for all other Government officials.

Dining cars and steamers.

The charge for meals in the dining cars and steamers is 15/- a day.

The meals supplied are not superior to those supplied in our own refreshment rooms and steamers.

First class steamer passengers may, if they desire, take their meals on the second class deck at either 6/- or 5/- per diem.

Catering Manager etc.

The system of accounting is very elaborate and has been adopted by the Wagon Lit company. I have enclosed with this report the regulations and all forms used in connection with the catering department as they will be of interest to such officers as are responsible for our own catering and it is possible some information that may be of use to us will be obtained from their perusal.

The Manager of the department is of German

German nationality and had previously been for some years in the employ of the Wagon Lit company He is paid a salary of £300 per annum and his commission of 2½% on the gross receipts brings his emoluments up to £600 per annum.

There is an attendant in each dining car and steamer who supervises the catering, accounts, etc.

These men have all had previous experience of similar work either in Egypt or on the Continent. Their salary is about £60 per annum.

During the tourist season European cooks are engaged for the steamers at £10 per mensem, but at other times, both in the steamers and dining cars, Egyptian cooks are employed at £8 per mensem.

Headquarters. The headquarters of the catering manager are at Khartoum and I was much struck at the completeness of the building containing the offices etc. These comprised the following:-

Catering manager's office. General office
Dry provision store. Wine Store.
Equipment store. Soda water factory.
Ice factory. Cold Store.
Laundry.

Laundry. Supplied by Fred Townsend and company, Enfield Lock, Acton, London.

Lots

Soda water plant, supplied by Bernards and Foster. I would like to draw special attention to this plant which generated its own gas. Most excellent minerals were manufactured, the principal secret of the success was due to the low temperature of the water, 40 degrees, when the gas was introduced. I was informed that unless this low temperature was adhered to it was impossible to manufacture good mineral water.

The system of corking was the same as that used for perrier water, and a great economy in expenditure on bottles was effected as all old perrier and similarly corked bottles were used for bottling minerals. At any time we renew our plant I recommend the adoption of a similar machine.

Port Soudan to Atbara. The journey between these places is accomplished in about 17 hours the distance being 362 miles. The steepest grade is 1 and the rails are 75 lbs. All the express trains are corridor and consist of the usual composite coaches and dining and sleeping cars.

The coaches are about 65 feet long and weigh [illegible] tons.

They are painted externally cream colour with distinctive lettering and numbers in brass.

No coach that is not painted this colour

colour may be attached to an express train.

Bed linen, towels, soap, etc., are provided.

Headquarters. At Ashara are the headquarters of the railway and the locomotive shops. These shops are extensive, well-equipped and up-to-date but the principal machinery is not driven by electricity.

Carriages and wagons. All carriage bodies are now constructed in the shops and as Mr. Revill is constructing coaches the cost may be of interest to me.

Sleepers. 6 feet by 9 feet to sleep fourteen, weight 33 tons, total cost £2,500.

Composite 1st and 2nd. 57½ feet by 9 feet, total cost £1,650.

Inspection cars. There are three large inspection cars for the use of the manager and heads of departments. These cars are 40 feet long and consist of kitchen, bath, bed, and dining room.

Four inspection cars are 42 feet long and are allotted to divisional and district officers; they are similarly constructed.

The body of a divisional coach costs £450, that of a district coach £350.

Goods wagons have a carrying capacity of 30 tons and 15 tons. Some of these wagons were roofed

roofed with galvanized iron and I gathered that this slightly reduced the cost and tare.

Motor trolleys. All officers whose duties rendered it necessary were supplied with motor trolleys and I venture to suggest that they might be adopted on our own line with advantage.

Tourist service, Kondoa to Victoria Nyanza. The General Manager was interested in the possibility of developing a tourist traffic on this route and in connection with this I quote extracts from a letter written by Mr. Phillips, one of the Directors of the British East Africa Company, who had recently accomplished the journey.

"His gentleman was not at all favourably impressed with the conditions under which the journey can be made at present between Kondoa, or Mejaf and Mtinga.

Porters were obtained with difficulty and at one point of the journey great trouble was experienced in preventing them deserting. The journey, which between Kondoa and Mimale should only take ten days, was not completed under 17. From Mimale to Butiaba the journey was made in the boat "James Martin" in tow of the "Nguia" as the "Samuel Baker" on account of the lowness of the river could not cross the flats at Lake Kubi.

Mr.

Mr. Phillips stated, however, that on arrival at these flats he found plenty of water and that the survey officer, presumably Lieutenant Morris, informed him that the "Samuel Baker" could have crossed with ease.

If you will refer to my report on the Nile written last November, you will see that I recommended the survey of this lake and if [illegible] transcribing the statement attributed to Mr. Phillips it would appear that a channel across these flats has been discovered. This is rather important for while the voyage between Nimule and Butiaba may be made in comfort in the "Samuel Baker" no person would travel for pleasure by the launch and boat.

When the motor road between Masindi and Butiaba is open the only part of the journey which will present any difficulty is that portion of it which lies between Nimule and Gondokoro. For those persons who do not object to a march of 140 miles this difficulty resolves itself into whether or not the supply of porters can be relied upon.

At Gondokoro they cannot, but at Masindi porters can be obtained with little difficulty and it remains therefore to ascertain if the Uganda Government would assist in obtaining porters at Masindi for the overland journey between Nimule and Gondokoro.

This

This assistance, if forthcoming, would have to be reliable and it would be necessary by some means to ensure that the porters did not desert on the way. The British East Africa Company are established at Masindi and if this assurance could be given them they would be in a position to act as agents and guarantee porters to intending travellers. We could then advertise the route.

There would be no trouble or expense to the Government in this and I feel confident that the Chief Secretary, Entebbe, would further, within reasonable limits, any project which encouraged tourists and others to pass through the country.

I did not gather that there was any likelihood of a railway being built between Kondekoro and Nimule, on the contrary there are so many more important works in the Soudan which call for priority that I [illegible] any possibility of a railway between these two points a very remote one.

Whether any natives inhabit the country this route traverses I am unable to say, but if they do it should not be a difficult matter to enforce such regulations as would ensure the road being kept in reasonable repair.

In connection with this route the following may be of interest.

Distance.

	Distance	Time in transit	1st Class Kassin. fare.	
oro-Khartoum	1081 mls.	1 days.	£10.12.7½	£.3.0
m-Cairo.	172 "	1 days	£15. 6.9	£3.0.0.

During the Winter there are special tourist rates from Kondokoro to Khartoum inclusive of food which for 1st class passengers is £30.15. 1½ and for European servants accompanying their masters is £10.19. 5½. It will be noticed that this rate is more expensive than the ordinary 1st class fare and kassin.

Ordinary inter-transit food are

1st class ½ per mile.

3rd " 1¼ farthings per mile.

The classification of freight is very meagre and only 4 classes are shown, class 1 being the cheapest and class 4 the highest.

Country produce is carried at class 3 rate or 1d. per ton mile.

The Department accepts no legal liability for any loss or damage to cargo but if such is occasioned by neglect will consider the question of compensation. A free passage is given to one 3rd class passenger accompanying a consignment of goods weighing 2½ tons or over.

Steam service Wady Halfa Shelal. This service was formerly a portion of the Soudan Steamers department but conjointly with the taking over by the Railway of the Soudan the Wady Halfa-Shelal steamers were also amalgamated with the Railway.

Railway.

Their upkeep both as regards maintenance and crews is undertaken by the Locomotive Department while they are under the control of the Transport for other purposes.

The fleet consists of eight steamers. The two largest the "Soudan" and "Britain" were built in 1908. They are 165 feet long by 25 feet beam. They differ from the "Stanley" in that they have one more deck but in fact all the steamers at present utilized in some way the upper deck which in the "Stanley" is simply a corrugated iron sun deck and affords in its present state no accommodation whatever.

This is a point we should turn our attention to especially as the "Stanley's" sun deck in its present state is most unsatisfactory and requires covering. Allowance for this alteration should be made in the estimates for 1915-16 and should at any rate allow for a sun deck of sufficient strength to admit of its being used as a promenade deck and also for the construction of a mosquito proof house.

Expenditure and revenue [illegible] Railway. In 1912 the estimated receipts from this service were £21,000.

The principal items of expenditure were as follows:-

Assistant

Assistant Director	£750
Head Office Staff	£1,416
Conductors, Messengers, etc.	£84
Steamers crews including 3 engineers at £36 and £46	£240
	£4,460
Dockyard staff	£931
Fuel	£7
Repairs, etc.	£[illegible]
Freight [illegible] general charges	£1,4[illegible]
Sundries	£1[illegible]

19 [illegible]

Wadi Halfa. The distance between Shellal and Halfa is 41 miles and over the route competing companies are met with. Goods rates class 1-4 are 55 piastres a ton. Class 5-7 is 35 piastres. Both are subject to a terminal charge at each end of 1 piastres. First class passengers £1.12.4., European servants £1.11.4. Native servants 5s.3d.

Khorsa to Khartoum. The journey is accomplished in 7 hours, the distance being 19 miles.

At Khartoum North are the headquarters of the Steamer Department including residences of officials, shops and floating docks, etc.

The following are the principal details

details of receipts and expenditure for 1915:-

eceipts.

reight and assengers	£37,800
iscellaneous	5,350
gyptian ar Department Transport.	27,670
rovinces and Departments ater transport and ire of teamers	44,17
otal	£134,99

Of this g... e last item is a paper tr... action be... the Teamers Department and the ...partme... concer...

...t is probable that the pension ... item is also a paper transaction.

xpe dit re.

Administrative and Dockyard.

1 irector	£1,300
1 enior Assistant Director £780-£900	840
2 Assistant Directors £720-£840	1,56
1 eputy Assistant Director £600-£720	660
1 ommercial Agent	600
1 Superintendent tores £360-£432	396
1 orks anager	552
1 oreman shipwright	330
1 lectrical engineer	432
1 oreman carpenter	300

clerks

Clerks, agents, messengers, etc.	26,014
Crews of all vessels including 26 engineers on salaries varying from £18 to £420.	30,610
Dockyard staff, labour, etc.	11,091
Fuel	29,300
Repairs	13,400
Various	1,91
	99,496

Administration. The department is at present [illegible] by a senior [illegible] and two assistants. It is proposed, however, to [illegible] distribution, and thereafter the [illegible] will [illegible] probably be as follows:-

Director

Senior Assistant Director

Assistant Director

Superintendent Engineer

Works Manager

Assistant Works Manager

Commercial Agent.

The Commercial Agent deals entirely with matters connected with freight, purchase, chartering of ships, etc.

The principal [illegible] employed in the workshops are Works Manager, Electrical Engineer, Foreman Shipwright, and Foreman Carpenter.

carpenter.

Scale of crew, during six. The "Amka" is a typical steamer for general work while the "Gadurmann" is used for the mail run between Khartoum and Gondokoro.

	"Amka", 1 boiler 100 feet x 20 feet.	"Gadurmann" 2 boilers. 120 feet by 25 feet.
1	Chief engineer	1
1	2nd "	1
1	greasers	2
2	firemen	4
1	trimmers	2
1	mid. rais	1
2	Reises	2
5	Sailors	7

The Chief engineer is in charge of the steamer and exercises general supervision.

Where only one 2nd engineer is carried he takes watch and watch in the engine-room with the greaser.

Watches are of six hours' duration.

In the stokehole one foreman is allowed for each boiler and the trimmers assist them as necessary.

In studying these figures it must be remembered that steaming is almost continuous both night and day. During the 14 nights I was away from Khartoum the ship was only at anchor 4 nights. On the Khartoum-Gondokoro voyage which occupies

occupies about 28 days the ship is steaming for nearly the whole period.

The composition of the engine and stoke-hole ratings should be compared with our own crews on Lake Nyasa.

The ships are lighted with electric light but search lights are not used.

There are two lightermen in each lighter and these together with the sailors place fuel as necessary close to the furnaces.

The sailors do not handle cargo at any time, all goods are loaded into lighters and off loaded from them by the owners. Cargo is seldom or never stored in the ships but in the lighters, and it is quite common for a ship to push three lighters ahead and tow two alongside making a total load of 2[illegible] - 300 tons.

The pilots are an excellent body of men and those I met with handled the vessels very skilfully.

One of the channels especially during low mile between Malfa and Shejal are very rocky and intricate.

Engineers. You will remember the difficulty we experienced some months ago in the engagement of second engineers so I will, as far as possible, indicate the conditions under which they serve in the Soudan.

Their commencing salary is £240 per annum and they can rise to £360 per annum, but there

there is no fixed scale of increments and it is therefore impossible to say what period elapses before the maximum is reached. It may be said that in no case is it probable that a lesser period than 12 years is necessary before reaching such maximum.

This pay is subject to the addition of an annual bonus of £60 and in some few cases to a charge pay of about £36 per annum. An engineer on his maximum would, therefore, draw about £96 per annum. This scale is about to be revised [illegible] details are not yet decided. It is proposed that the salary should be £42 per annum rising to £39 per annum with no allowances whatever. It is doubtful whether men will be obtainable at this lower salary but I am informed that should Englishmen not apply for any vacancies that may occur the work they are required to do can be equally well done by Greeks or Italians at a lower rate of pay and that the department is perfectly prepared to engage the latter. Neither free quarters nor furniture are provided and even on board engineers are required to provide their own coal, servant, and all equipment such as crockery, bedding, etc. and of course provide their own food. In steamers where there is a proper catering service the engineer supervises it and in return is allowed free messing. This system will be discontinued and catering managers employed.

There

There is neither/nor provident fund but I believe some proposals are now being put forward to remedy this. Four months full pay leave are given every two years, such leave commencing on departure from Cairo and ending on the return to Cairo. Three and a half months, therefore, be spent in England.

Free passes are provided on the Egyptian railways and half fares are allowed in Egypt, the person taking leave pays his passage from Egypt to England and back. The return fare, 2nd class, between Egypt and [illegible] including incidental expenses is approximately £ and this sum must be, therefore, deducted from the salary of any engineer proceeding on leave.

Some Egyptian engineers are similar to the type of men we get in the lake steamers but others who joined years ago have proved themselves capable of taking high positions. One is Assistant Director on a salary of £840, one went over to the Railway when the Halfa-Shelal service was taken over by that department and is now drawing a high salary. Two more are Works and Assistant Works Manager on salaries of about £500 or £600. When we required a Deputy Superintendent Engineer we were compelled to apply to the Crown Agents for one as we had no engineer in our service who held the necessary qualifications to fill this post. With the prospect of eventually holding a higher position a better class of man can be attracted.

The

The Egyptian engineers can rise to £140 per annum, and their general rate of pay is only a little higher than that of our Uganda engineers.

Pilots and sailors. There are no European captains in any of the steamers and the pilot, or reis as he is called, does all the pilotage and handling of the ship. Three reises are carried in the larger ships, their pay varying from about £ to £5.1 s. per annum.

The pay of sailors and firemen is about 1 [illegible] per than the pay on Lake Victoria.

Fleet. The fleet consists of a large number of steamers, tugs, launches, sailing boats and barges of various sizes and descriptions. Many of these steamers are fitted with guns and are classified as gun boats and are relics of the old days some of them dating back to the time of Gordon. Regular services are maintained between various points on the rivers, while other steamers and boats are detailed for the use of districts for administrative purposes.

The principal points which are of interest to us are the construction of the steamers and the composition of the staff appointed to run them.

The construction generally is similar to that of the "Stanley" i.e. the king posts are of the girder type and do not come up

on

on the outside of the vessel as in the case with all stern wheelers I have seen on the Niger.

The reason for this is that by bringing the king posts in board they are directly in line with the main bearings of the crank shaft, the fore ends forming supports for the engine bed plates, and it is maintained that this system gives more strength and lessens vibration.

The king posts are tied together in the fore and aft and also athwartship direction.

You will remember that the chief objection to this system in the "Stanley" is the waste of space between the cabins and king posts and the exceedingly bad arrangements of Bath Rooms and W.C.s.

That objection is solely due to the bad design of that part of the ship and the fact that the available space for cabins etc. is not used to the best advantage.

The "Amka", in which ship I travelled up the Nile, is about 100 feet by 20 feet and has cabins for 14 passengers, two W.C.s., two bathrooms, 1 saloon about 17 feet by 10 feet and a smaller one about 14 feet by 8 feet.

There is ample space for sitting out and the king posts and tie rods do not in any way interfere with the comfort of passengers or restrict the accommodation.

The king posts and tie rods ascend through the deck about 2½ feet inside the outer edge

edge and this space leaves an ample gangway all round the ship. The construction of the cabins is as follows.

The stern wall is carried right up to the top of the sun deck and forms the after bulkhead of the two bath rooms.

The deck house containing the cabins and saloon is carried close out to the king posts.

The doors of the cabins are so arranged that they do not come near the king posts.

The ... are built out over the sponsons and are supported by girders.

They project about three feet abaft the stern wall.

In the centre of the ship is an open space about 20 feet square which is used for sitting out. Forward of the funnel are two more cabins and a small saloon.

The deck is carried right forward to within about 10 feet of the stem

On top the sun deck is sufficiently strong to carry a small shelter for the pilot and a mosquito house for passengers besides being used as a promenade deck.

The "Cadurcum" which is similar in size to the "Stanley" has accommodation for 32 passengers.

The scheme for giving extra ventilation to the cabins is well worth adopting. The sun deck is carried out to the ship's side and is

flush

flush with the cabin ceilings. Directly over the cabins, however, the deck is raised some 18 inches and the sides of this raised part consist of flaps which open outwards admitting air into the cabins.

This raised part is made sufficiently strong to carry a mosquito proof house and also serves as a promenade deck. There were many different types but in all the ships I saw the most had been made of all available space.

Barges. These are sometimes fitted with an upper deck for the carriage of troops and 3rd class passengers but, otherwise, present no features of interest.

Dockyard. A great advantage at Khartoum is that there is no objection, as there is at Atbara, to houses being placed close to the river banks consequently the residential quarters, offices and shops are all close together.

From a point of view of supervision this is an ideal arrangement but as it is one which can never obtain at Atbara it is useless to dwell on it.

The plant consists of two floating docks and the usual machine, carpentering shops, blacksmith's shop etc. and stores. The machinery is electrically driven the power being provided by dynamos driven by two engines which burn coal generated from Anthracite coal.

Building.

Building. The hulls of the vessels are designed and built in the yard the estimated saving on ordering them direct from England being about 10%.

Wady-Halfa. The headquarters of the steamers now controlled by the Soudan Railway are at Wady-Halfa and I had hoped to have had time to visit the shops, etc. and also look over the two large tourist steamers. The train was twelve hours late, however, in arriving and I was obliged to embark at once on board the steamer for Shellal.

On my arrival at Cairo I called on the General Manager of the Egyptian State Railways and from the Deputy Manager obtained the following information which even if it cannot be utilized will be of interest .

All of their large contracts are put out to open tender and competing firms are not confined to such as are English.

In a recent tender for a locomotive, offers were received from English, Belgian and German firms and a study of the following figures will be instructing:-

English	Lowest tender	£3646	Delivery	52 weeks.
	Highest "	£4338	"	"
Belgian	Lowest "	£3210	"	46 "
	Highest "	£3350	"	36 "
German	Lowest "	£3190	"	32 "
	Highest "	£3800	"	40 "

I was informed that the standard of workmanship and materials used by these foreign firms was quite equal to that of English firms while delivery within the specified time was more certain.

SUDD.

In Sir William Garstin's "Report as to Irrigation Projects on the Upper Nile" (Egypt No. 2(1901) and in "The Anglo-Egyptian Soudan" by Lieutenant-Colonel Count Gleichen are two chapters devoted to the description of Sudd and from these books I have taken very brief notes and extracts, which are herewith given.

Sudd is a name which by custom is applied to the huge marshes through which the Bahr el Gebel, Bahr el Ghazel, Bahr el Zaraf, and the lower portions of their tributaries wind their way.

The area of these marshes although difficult to estimate cannot be less than 35,000 square miles. A great part of this area is covered with a shallow sheet of water probably nowhere deeper than 2 to 6 feet. Over almost the whole of this area thick reeds and swamp grasses have sprung up.

True Sudd. Although the word "Sudd" has been applied to the whole of these marshes real sudd is only the floating vegetation which is driven into the river channels and there forms the block or sudd.

Nature of Sudd. The nature of the sudd in the Bahr el Ghazel differs considerably from that in the Bahr el Gebel, in the latter the main factors are papyrus and "um-soof" reeds which with the earth adhering to their roots form the

real

feed obstruction.

Many of the smaller swimming plants such as azolla, utricularia and pistia are mingled with the others but do not play an important part in the formation of the obstacle.

Vetch (or another of wool, so called on account of the irritant hairs found on its leaf sheaths which adhere to the skin of anyone touching them.

Azolla. Resembling moss in texture.

Utricularia. Resembling feathery floating structure.

Pistia. A plant with big leaves or a flower like a lily.

In the Bahr el Azel the sudd is chiefly composed of the swimming plants, is much lighter in texture than that of the Nile and consequently much easier to remove.

Formation of sudd. In either case, the channel in the swamps previously referred to extend large shallow lagoons surrounded on every side by a luxuriant growth of papyrus and the roof. Both these plants grow in water but not to any great depth and the Um-soof will not stand such a depth of water as will the papyrus.

The latter attains a height of from 15 to 20 feet with fibrous roots which strike deep into the ground whereas Um-soof rarely exceeds 8 feet in height and its roots do not extend so deeply as do those of papyrus.

These

These roots are bedded in the soil below water but strong gales loosen their hold to a large extent and if accompanied by any rise of water large masses are set free and float on the surface of the lagoons. These lagoons are in many places connected with the river and eventually the masses of reeds are forced into the channel. Here where the current carries them with a strong swirl there ere long their course must of necessity be arrested. Masses of weed follow in quick succession and thus the block which some times attains a thickness of 22 feet occurs. Some of these blocks are as much as a mile long. Add frequently sinks to the bottom, and decomposes, gradually raising the bed of the channel.

Recent blocks. Major Sanderman left Lokoja on December 15th, 1899 and by March 7th 1900 had cleared 8750 yards the thickness of which varied from 5 to 19 feet.

The party worked with five steamers and a gang of 800 labourers guarded by 100 Soudanese. There were five English, several Egyptian officers and some English Non-commissioned officers.

In January 1901 Lieutenant Drury with the help of an English sergeant cleared 75 miles of sudd. No details are given as to what staff he had.

Method of clearing. I give verbatim the method employed by Major Peake:-

The

The first operation was to cut and burn the whole of the vegetation growing on the surface; this was done by a party of men with swords, native hoes, and axes.

Immediately this was done the line to be taken up for the first channel, generally about 12 yards in length, was marked out, this was trenched by the prisoners armed with native hoes, picks, axes, and saws, into pieces 4 yards square. After cutting down about 1 foot from the surface the water infiltrated; the men continued cutting until, owing to the depth of water, they were unable to get any deeper. Holdfasts of telegraph poles were then driven as far as they would go around the edge of the piece. After this a 1½ inch flexible steel wire hawse was sunk as deep as it would go by means of pronged poles, all round the piece to be removed, the ends of it were made fast to the bollards in the bow of the steamer, one on the starboard side and one on the port, leaving sufficient slack wire to allow the steamer to go astern some 20 or 30 yards before she got the strain; "full speed astern" was then ordered. Full speed was kept up continually if the piece showed any sign of becoming detached until it came gradually away; as soon as the piece was quite clear, one end of the hawse was cast off, and the piece was allowed to float down the stream, the holdfasts were pulled out by means of a rope, one end of which was made fast to the

bow

bow of the steamer, and the other by a hitch to the end of the holdfast. If the piece showed no signs of coming away, the engines were reversed and the steamer was brought close up to the sudd and then went astern again. This was repeated again and again until the piece was detached. Some pieces were known to take as much as two hours to get away. Sometimes with very thin sudd, after it had been trenched, the steamer would be run up with her bow on to the sudd, and on going astern would carry the piece with her; also with light sudd a grapnel anchor fixed to the bow of the steamer where going astern was found sufficient to tear away the piece.

Very often the sudd will be found with its roots adhering to the bottom; this is especially the case in a year when there is a very low Nile, or close up to the banks, when the first leading channel is being widened.

In this case a grapnel or ordinary anchor, sunk at the bottom of the river and then dragged along by the steamer is useful. As soon as the leading steamer has opened up the channel a sufficient length to enable her not to interfere with a steamer coming behind her another steamer is put to work, the same way as the first, to widen the channel.

This is generally laborious work, as there is not much current to act on the sudd, and in consequence it takes longer to get it away.

In

In cutting the trenches care should be taken to cut or saw through all roots.

Other remarks on sudd cutting. During 1906 the Uganda Government communicated with the Soudan Government with a view to ascertaining the methods the latter adopted in dealing with sudd.

This matter was referred to Al Mimbashi Scott Hill who had had personal experience in sudd cutting and he gave the following information.

(1) The Sudd is of so many varieties and so differently formed in various places that no hard and fast rule of dealing with it has yet been found.

(2) Speaking generally the use of a party of fairly good swimmers, a steamer and some simple tools has been found the most successful way.

(3) Experiments have been made with explosives and with dredgers both of the suction and grab variety, the partial success of the latter being lessened by its fuel requirements.

(4) The Sudd you have [illegible] with is presumably on running water, and therefore mainly composed of the Geef.

Our method of attack requires:- One steamer - sternwheeler preferred - as there are no screws to foul, a party of about 20 men some of them good swimmers - Sailors preferred - half a dozen carpenters' hand saws, about 2 feet 6 inches long, and a couple of dozen swords or knives for slashing down the grasses. We used old sword blades a couple of feet long with wooden handles.

In

In addition the steamer must have a good many fathoms of stout rope and a coil of 2½" wire hawser, and if she has a small steam capstan so much the better.

Get your steamer on the down side of the sudd; send the men on to it with swords to cut down the growth for a width slightly greater than that of the steamer. Next with the swords and saws cut through the roots so as to divide the surface sudd into rough squares of about sixteen feet, these vary, however, according to the strength of your steamer.

The sailors now lay out the wire already secured at one end round the nearest of the squares the other end is secured on board and the steamer goes astern. If the wire has been well laid and the Sudd is "live" the square will come away, and can be dropped when it has been towed far enough down stream to float away of itself or at any rate not to inconvenience further work.

If the Sudd is a real block only the live top layer will come away and the decayed mass underneath will expand sponge-like and take its place. The wire must then again be laid out and possibly several times before there is depth enough for the steamer to tackle the next piece.

Although you may leave several feet of debris in the river bed as you progress this need not matter, as once a current is flowing through

through the channel you have made it will rapidly scour out.

Once through to the width of the steamer it is a simple matter to widen as you have the full strength of the current to assist.

In the Bahr El Gabel there is never any difficulty in discovering the true channel even if entirely choked with debris as a pole can be pushed through until the true river bottom is found.

It may be an impossible matter to reach the down side of the block with your steamer, in which case there is nothing to do but laboriously back a small passage through from the up side through which you can haul the steamer or possibly temporarily dam the river as Baker did on one occasion in the Bahr El Ghazal.

Further remarks by Director of Steamers.

This information was on October 30th, 1906, supplemented by the following remarks made by the Director of Steamers:-

(1) The most important factor is the existence of a current to carry away the blocks as soon as cut up and pulled out.

If the steamer has to tow these blocks more than two or three hundred yards in dead water, the process is interminable, so that I consider it is of paramount importance to get a clear channel through from end to end, unless of course there is sufficient

sufficient current from water passing under or around the block.

In such a case the only method I know is to cut and haul out the Sudd by ropes, the men working on the banks and roping up the growths.

In the Bahr Al Arab, 50 men averaged 1000 yards a week in this manner cutting a channel 7 yards wide for a length of eighteen miles through which a steamer was eventually passed.

When a current is flowing, the widening of the channel is comparatively simple, as piece by piece can be pulled out by a steamer and left to drift away.

The pieces should be cut small to prevent blocking a min down stream, but if light several of them can be hauled out at one pull.

(2) No special plant has been used on the Nile, and I do not think anything would be of much use except very powerful bucket dredgers with strong hooks to tear away the Sudd. Even then it would be a difficult problem to deal with the grass and reeds pulled out.

I believe hard labour to be more satisfactory than any of the many suggestions that have been made.

There is no practical difficulty in cutting up the Sudd with saw bill-hooks, etc., and

as already stated the difficulty is to get it carried down stream.

Comparison to conditions on Lake Kioga.

Having studied the methods that have been adopted in clearing sudd on the Nile it remains to be seen how those conditions compare to those obtaining on Lake Kioga.

In the first place it will be noticed that the operations just described consisted entirely in removing sudd which had floated into, or blocked, a known channel; a channel which contained deep water.

The sudd moreover is described as being 6 to 19 feet thick whereas I was informed by Mr. Hardie that the average thickness of the sudd on Lake Kioga is only 2 feet.

Again on Lake Kioga the deepest water we have found between Gambwe and Kiri is about ten feet while it often drops to 2 and 3 feet.

Neither are we removing sudd which blocks a known channel but are cutting out sudd where it is rooted in the ground and are, therefore, either widening a small canoe channel or cutting a new one.

The scouring out process which has been mentioned has not proved beneficial to us for although where we have opened a channel a current has been induced no scouring out has taken place, but on the contrary between Mile 4 and 5 the channel has silted up.

We

We know that it is possible to get from Sambwe to L. Salisbury by canoe and we know that the bed of the latter is 32 feet higher than Sambwe. There must therefore, be a flow of water from L. Salisbury to Sambwe and it is of course probable that could we but find it there is comparatively deep water all the way.

That, however, for the moment we are not concerned with and the question is whether the process of removing the sudd on the Nile is the best and most economical for us to adopt.

There can in my mind be no doubt that it is.

In the remarks quoted by the Director of Steamers he states that 50 men averaged 1000 yards a week cutting a channel 7 yards wide.

My figures for Lake Kioga show that 1 man cut 1 80 feet 6 yards wide in the same time which is a very poor comparison, but it must be remembered that our men were inexperienced and were of poor physique and it may be expected that their rate of progress in the future will be much faster. Be that as it may if we can only clear a channel 1000 yards long by 30 feet wide in one week with say 400 men at 15 cents per day per man neither the expense nor the time we shall take to reach Aga will be very great and it will be as effective, and certainly cheaper than the purchase of an expensive dredger for dealing with sudd.

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In the remarks quoted by the Director of Steamers he states that 50 men averaged 1000 yards a week cutting a channel 7 yards wide.

My figures for Lake Kioga show that 100 men cut 1350 feet 8 yards wide in the same time which is a very poor comparison, but it must be remembered that our men were inexperienced and were of poor physique and it may be expected that their rate of progress in the future will be much faster. Be that as it may if we can only clear a channel 1000 yards long by 30 feet wide in one week with say 400 men at 15 cents per day per man neither the expense nor the time we shall take to reach Aga will be very great and it will be as effective, and certainly cheaper than the purchase of an expensive dredger for dealing with sudd.

sudd.

There is, however, another aspect of the case and that is that although we can effectually and inexpensively deal with the sudd the problem of deepening the channel still confronts us and if we decide on doing this we shall require a dredger.

Dredgers. The dredging on the Nile consists almost entirely of very extensive schemes for so raising the banks of the rivers as to prevent the wastage of water and increasing its supply for purposes of irrigation. No dredging, except on a very small scale has been undertaken for the improvement of navigation.

The dredging fleet is the property of the Irrigation Department and consists of the following:-

One six cubic yard grab dredge

One 24 inch hydraulic dredge

One seven cubic yard dipper dredge

One tow-boat and some 8 or 10 coal barges of from 100 to 300 tons capacity

The hydraulic dredge was after a time dismantled and sent to Egypt where it was reconstructed.

No dredging is at present being done and we, therefore, unable to see the dredgers actually working but I saw enough of them to form an opinion that the purchase of anything approaching them in price or capacity of spoil output would be

waste.

sums of money with the possible exception of the grab dredger. These dredgers form the nucleus of a fleet which if the proposals made in 1911 by Sir William Garstin are carried out will deal with works the approximate cost of which is between two and three million sterling.

Communications. Lake Niogn. Any schems for the improvement of communication by utilizing the waterways of Lake Niogn must be considered in conjunction with the improvements in communication by road which are now under construction on the shores and in the hinterland of Lake Niogn. Reference should be made to map 220/D/766 "Map shewing improvements in communications contemplated under the Imperial loan 1913-15".

Proposed roads. (1) Lira and Asuia to a point on Lake Kwania near Mabiese.

(2) Ambiramaido to Kelli

(3) Pilitok and Kalaki to Kampal.

(4) Moale to Kumi

(5) Pelekon to Maliro.

Dealing with these in rotation (1) would require a small amount of dredging but I have no information to enable me to say how much; (2) Ships can get within a few yards of Kelli and very little dredging is required; (3) No details but little if any dredging required.

As regards (4) it will be seen that the proposed road passes along to an arm of the

lake

lake and provided such arm would be made navigable and a large quantity of cotton was produced in the country lying to the west of it It is conceivable that a port at the extreme end of the arm might serve as a site for a ginnery. Cotton produced to the North or South would probably go to Aumi and Mbale respectively.

(5) The road from Malisa to Maliro crosses the Mpologoma River but it has been suggested that Agute should form the port for Malisa. There is no information at present to enable me to say if this is possible.

Existing road. There is one road from Mbale to Lgunga and Jinja which crosses the Mpologoma River above the proposed road between Malisa and Maliro and any exploration of the river would enable an opinion to be given as to the possibility of establishing a port there.

Roads completed or under construction.

(6) Serere to Bugondo

(7) Soroti to Malli

(8) Aumi to Agu.

As regards (6) Bugondo does not require dredging but as regards (7) the approach to Malli requires a certain amount but not much as ships can even now get to within a few hundred feet of the pier.

The rough estimate of dredging required for (8) that is to make a navigable waterway between Bambwe and Agu is 704000 cubic yards. This amount is taken from Lieutenant Buckler's chart Sheets 1

to

to 3 with soundings reduced to Pingara gauge six feet.

Other dredging required.

(9) Lemmanum. It has been stated that cotton in large quantities may be produced in the vicinity in which case the approach to this port will require dredging.

(10) By cutting through the papyrus between lakes Nioga and Kwania near Namasali a considerable distance would be saved by vessels steaming between these lakes. It is impossible to say until any proposed canal has been surveyed how much dredging will be required.

(11) There is a channel to the westward where the Nile enters Lake Nioga which requires some papyrus removing but little or no dredging.

(12) There is a similar channel to the northward which although navigable would be greatly improved by dredging.

(13) It must be decided whether the canal from Agu to Lake Salisbury is to be cut, and in connection with this consideration might be given to the desirability of constructing a road from some point on the southern shores of the lake to join the Rumi-Agu road.

If it is not considered advisable to cut this canal such as road would provide a means of bringing cotton to the ginneries at Agu.

I have endeavoured to indicate the connection

connection that must exist between any improvements in land and water communications and the possibility of so combining such improvements that the best results may be obtained. This connection is especially noticeable in (13) where two alternative schemes suggest themselves.

As regards dredging (1), (2), (3), (7), (9), (11) and (12) do not present any great difficulties that could not be overcome by the use of a small dredger, and (6) does not require any dredging at all while for (5) we have comparatively detailed information. To be enabled to give any estimate for (4) (8) and (10) a detailed survey is required and this survey should be commenced without delay. The points to be considered are the possibility of opening up the Kapologoma River and to ascertain how far up it is, or could be made, navigable. To ascertain whether Kgute is, or could be made, a suitable port for Kelim and if not where such port might be made. To ascertain the length and route of the proposed cuttings between Lakes Kioga and Nwania and also the amount of dredging, if any, required.

In connection with this question of surveying there are several rocky and shallow patches in both lakes which require surveying altogether apart from any considerations of opening up new waterways.

On Lake Victoria there is at least twelve months' surveying work in connection with the

the route from Busingo to Sio and Mjanji; the harbours of Sio and Mjanji, the channel between Sio and Jinja, and the harbour of Mbango.

I recommend provision being made in next year's estimates for two survey officers to be employed on either lake as may be considered necessary and if at the present time there are any spare officers in Nsumu they should be detailed to commence this work now.

As regards (13) I think the possibilities of cotton production in the vicinity of Lake Salisbury and its means of exit from the place of production should be fully discussed and I suggest that the principal people qualified to give an opinion would be the Provincial Commissioner, Director of Public Works, Director of Agriculture and representatives of firms interested in the cotton industry. I think this necessary as some doubt exists as to the possibility of opening a canal between Aga and Lake Salisbury on account of the difference in levels between the two places. In the absence of such canal it would appear that all cotton grown on the Eastern side of Lake Salisbury would find its way to the ginnery at Soroti and thence to the port of Lalli. Such being the case it would be necessary to extend the road from Soroti to the Eastern shores of the lake.

A

A road from Aumi to the Southern shores of the lake would place that district within comparatively easy distance of the ginneries at Aru.

If cotton were produced round the shores of the lake it would be an easy matter to place a small steamer or lighter on the lake and bring this cotton to the point where the road to Aumi commences.

I put forward these suggestions to show that even if the proposed canal between Aru and Lake Salisbury is proved to be impracticable there is no reason why any cotton produced in the vicinity of Lake Salisbury should not find a ready exit.

Proposed Aru canal. As ginneries are already established at Aru and a considerable amount of money and labour have been spent on endeavouring to open water communication between these places it is most important that some definite policy be adopted regarding this canal before the heavy expenditure which will primarily be entailed by the purchase and upkeep of a large dredger is incurred.

The following schemes may be considered

(a) Communication by steamer and lighter during those months when the water is high.

(b) Communication by light draught motor driven lighter.

(c) Communication at all times by dredging

a

a channel.

(a) At the end of October 1911 Lieutenant Buckler surveyed from Agu to within a few miles of Sambwe and over the whole of that distance the least depth found was 3 feet. Provided that this depth is maintained for three months the traffic between Agu and Sambwe should be moved in that time, and with a minimum depth of 3 feet either the "Speke" or "Grant" should be able to navigate this channel. In the Niger and its branches and also on some of the branches of the Nile certain parts of these rivers are only open for a comparatively short period and during this time all the traffic for the year is moved. With the exception of a certain amount of dredging on the Niger, which was carried out in 1911-11, between Lokoja and Baro no attempt has been made, or has been considered necessary, to deepen these rivers sufficiently to keep them open for traffic all the year and provided a steamer and lighter can pass between Agu and Sambwe for a few months of the year there should be no necessity for any dredging between these two places.

During the next few months every effort should be made to get either the Speke or Grant and a lighter from Sambwe to Agu so that we can tell whether with the existing depth of water this is possible.

A certain amount of cutting is required near Agu in order to widen the existing

canoe

canoe channel out there is no necessity to make this channel 150 feet wide as was originally proposed. Prior to leaving East Africa, I gave instructions that this width should be reduced to 100 feet. Since then I have had the opportunity of discussing the clearing of sudd with Lieutenant Drury, Director of Steamers, Soudan, and he informed me that when he was opening a channel through the sudd he was satisfied if he made it just sufficiently wide to admit of the passage of a steamer and even if we confine ourselves to cutting a channel 75 feet wide it should answer our purpose for the present, and it will be a simple matter in the future to widen it if necessary. Another point which Lieutenant Drury considered important was the necessity of following the deepest water and I think that in order to make as straight a channel as possible we have perhaps deviated from this.

Lieutenant Drury ascertained where the deep water was by sounding with a sharp iron [illegible] which easily penetrated the sudd where there was deep water underneath.

We know that a canoe channel exists not only between Bahrs and Ayu but between Ayu and Lake Salisbury, and it is probable that this channel is where the natural flow of the water is; in fact it is almost certain that this must be the case. If we assume this to be correct it would be folly to deviate

deviate from this line in order to obtain a straighter channel. Such a channel would be a deviation from the natural flow and would be certain to silt up.

(b) An alternative scheme is to move traffic between Kambwe and Agu by means of a light draught lighter propelled by a motor and it appears to me that this experiment is well worth trying. The cost would only be a few hundred pounds and the lighter even if not a success between Kambwe and Agu could always be utilized on other parts of the lake.

(c) Until (a) and (b) have been considered I think that the question of dredging should be held over at any rate as far as the Kambwe and Agu canal is concerned.

We have in the past assumed that the channel already cut represents the deepest water but after having very carefully considered this question I am by no means satisfied that this is the case and in the circumstances I cannot at present recommend the large expenditure we must incur in the purchase and upkeep of the large dredger costing on Lake Mioga not less than £25,000. Under "Communications Lake Mioga" 4, 5, 10 and 13 require considering. My proposals are practically contained in this report but I will now summarize them.

Those points which do not immediately affect the steamers and opening up of Lake Mioga

I have included in the report because it appeared to me they might be of general interest to the Railway and as the opportunity of obtaining this information was available it seemed unwise to omit it.

Recommendations.

Steamers. (1) Reconstruct the "Stanley's" sun deck and cabins adopting similar ventilation to that provided in the "Omdurman".

(2) Strengthen the sun deck to admit of its being used as a promenade deck and erect upon it a small mosquito proof deck house.

(3) In any future stern wheel steamers that may be designed to make better use of the available space for passenger accommodation.

Route between Lake Kioga and Gondokoro.

(1) Complete the survey of Lake Kubi, if this has not already been done, and ascertain if there is a channel across the lake which will admit of the passage of the "Samuel Baker" at all seasons of the year. If such channel does not exist whether it can be made.

(2) Ascertain if the Uganda Government can guarantee a supply of porters to a firm, acting as agents to intending passengers, for transport from Kisale to Gondokoro.

(3) Ascertain from such firm what the cost of each porter would be.

(4) When this information is available, and

and if satisfactory, arrange in connection with the Soudan Steamers department for this route to be advertised.

Note. The route should not be advertised until such time as the motor road between Masindi and Butiaba is open.

Unless it is possible to procure porters at Gondokoro either locally or by having them sent from Masindi to Gondokoro intending passengers can only use this route from the Uganda end.

Sudd cutting and dredging.

(1) To use manual labour as described by the Director Steamers, Soudan, for cutting and removing Sudd.

(2) Appoint two survey officers.

(3) Survey the Apologoma River with a view to ascertaining if Agute is suitable for a port, if not where a port can be made and what dredging or cutting is necessary.

(4) Ascertain if any deep water exists between Bombo and Aru in the vicinity of the channel which now in some places only shews 2 feet of water. This is most important as its discovery will, if it is decided to make a channel capable of admitting a steamer passage between these places all the year, save a very large expenditure.

(5) Decide whether it will be better to open up roads to communicate with Lake Salisbury as

as previously described or whether endeavours should be made to open communication by water. If the latter is decided the deep water channel, if any exists, must be found.

(6) To confine the width of any cutting to 75 feet at any rate for the present.

(7) To fit a motor to one of the existing lighters or purchase another lighter to be propelled by motor.

(8) Until the information required under , 4, and 5 is available to postpone the purchase of a dredger.

In conclusion I should like to express my thanks for the courtesy that was extended to me by the various officials whom I met in the Soudan and to Lieutenant Drury who very kindly gave me the photographs of sand cutting with which this report is illustrated.

R. H. Reynolds Ras
Marine Capt
Uganda Rly
24 8 '17