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Report

On the Navigation of the Zambesi.

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In endeavouring to form estimate of the value of the Zambesi commercial purposes, [it is necessary to recollect] we were in the first instance to trust the opinions of naval officers had visited it; and the late
Captain Parker together with Lieutenant having declared that it was capable of being used for com-, though the Portuguese never , and do not now enter it directly the sea, we trusted in the testimony our countrymen, and though we to find a passage in by
Parker's Luabo, we discovered a
~~a~~ safe entrance by the branch
Kongone; and H. M. S. Lynx,
Captain Berkely, at a subsequent , found a good channel

[0002] the main stream (Parkers Luabo) though had failed to observe it in a three search. The question of safe entrance the sea having thus been satisfactorily , our attention was next directed the rest of the river - the subject of report.

[It is desirable also to that]in an experimental Expedition ours, it was plainly an imperative to select the most healthy period the year in order to avoid the fate the Great Niger Expedition. Had we any time between January and , a large vessel could have been up as far as Tette, but [that] is the unhealthy time of the year, and then looked on the African fever a much more formidable disease we do now. We entered the river June, when the river was falling , but even then, the official of Captain Gordon R. N. and naval officers, were precisely same as those of Captain Parker Lieutenant Hoskins. Their

[0003] however, referred to only about miles from the sea - Mazaro - the at which the Portuguese use of the begins. We have now enjoyed a experience, which is the shortest in which all the changes that occur , can be noted, and we have examined the ~~whole, without attempting any regular survey~~ from the to Tette five times over, in a
~~shaky~~ craft[,]~~of the Niger canoe or pot-bellied shape,~~ the top speed of which
(3 1/2 knots)[,] admitted of nothing being in a hurry; and may therefore considered in a position to give opinion of equal value to that of flying , better qualified in all other respects the task. ~~As it was expected that my companions should collect fuller information than I could formerly furnish, and~~[As] a report on the river would incomplete without a description it when at its lowest, I sent the of M~~r~~[T.] Baines to the ~~R. G. S.~~[Society] was written at the worst part the river, and in a season said by all be one of unusual drought.

[0004]
M~~r~~ B.[aines] was taken up by a southern which contained much less water that which we ascended a month but adopting that journal as what the river may again in a season of drought. I would add that in passing from the sea Tette, when the river had fallen still than at the period when the journal penned, we were obliged to drag the over three crossings 100 or 150

feet of from 24 to 18 inches of water. is not however to be understood that is then the general depth. In the broad of the river we have three or four , and the greater part of these channels water from 8 to 15 feet deep, even the river has reached its lowest ebb. we are often obliged to cross one channel to another, sometimes from one bank the other, and it is in these that the difficulties occur. am not aware that anything has written of[n] the form of the bottoms rivers, but familiarity with that & the on the surface, will enable one man
~~will enable one man~~ to fine three fathoms, while

[0005] will run aground on one two feet. From our experience a year in which the river was low[,] and the rise deferred a later than ordinary period, it is that a vessel really of 18 inches two feet [draught] could ply at all seasons the first 300 miles of the Zambesi.

At my suggestion a tide pole planted at Tette by Major Secard the lowest point the river in November /58 - that in 18 inches were found in ~~the~~[a]
[few] crossings, adopted as the low water . By careful measurement the theodolite the river was at that point to be (964) hundred and sixty four yards bank to bank, which if remember rightly is more than the width of the Thames at London Bridge. At its lowest it contained between 300 &
400 yards of water of various . the deep channel of

[0006] , in which the vessel lay, was from to fifteen feet deep. As it enables to form a clear idea on the subject may mention that we lost an anchor when the water rose[,] and the volume water being always considerable[,] we no hope of getting it again by left high and dry as a ship is at her anchorage in the
Niger *[* Laird & Oldfield's book (?)]* At Shuramba Dembe river is 3490 yards wide or
1 3/4 geographical miles, nearly. Shigogo it is broader probably miles[,] but large islands it into five or six channels. is evident that with such an of spread, if the current the Zambesi were very rapid, rise of several feet at Tette would of comparatively small value Shigago. We therefore took the of marking a perpendicular at the East end of Lupata, adopting at Tette the top of 18 inches at the

[0007] as low water mark and carefully the velocity of the stream at the rapid parts we knew. the result both by patent and common logs that no part of the river below Kebrabasa a current of four knots. We were suspicious as to the correctness this result as some of our naval [,] judging from sight only[,] spoke six and even eight knots. but the common log and the Patent log hour after [,] in parts that this vessel could stem[,] shewed no more than
3 1/4 knots. The general current 2 1/4 knots and under. The of the river observed by
Major Secard in the accompanying and by ourselves at Lupata elsewhere[,] may therefore be as applicable to the stream. The amount of fall also in the table, being once down to 7 1/2 feet that the character of

[0008] torrent cannot be applied the noble Zambesi any more it can be to the Nile

From November to January river rose gradually to 8 feet low water mark. From 15$\underline{\text{th}}$ January to the 15$\underline{\text{th}}$ May had depth enough for a large . Though Major Secard that this year it attained a minimum height and accuracy of this is confirmed the fact that only a small of wheat is sown parts flooded by the river the parts employed for crop. The data now submitted to prove that a vessel of feet draught, such as are for the Mississippi could the whole of ordinary years. knew of no other observations which the navigability or non navigability the river can be pronounced upon but leave for the consideration of

[0009] those better qualified to give an .

We have in the course of one year up into small pieces upwards one hundred and fifty tons

lignum vitae alone, which to the average prices London during 1858 was about £900. This wood dry was, in the absence coal, the only fuel with which could get up steam[,] owing the boiler tubes being singularly all on one side and below the level of the [,] from which novel arrange-one side remains long cold the other is hot like a patient the palsy; and four & a half five mortal hours of fuel are required to get up - yet by incessant labour a dogged determination to

[0010] all the good [possible] out of an engine intended to grind coffee in shop window, we have traversed
2350 miles of river. Now had been permitted to shew what be effected in this one of commerce, it is not to say that every the saw went through vitae it might have been secure or dress a log. Without great labour we might have cut thousand instead of one hundred fifty tons of that valuable , and given a practical of what may and probably soon will be by the Germans Zambesi commerce.

The only paper that reached up to the middle of June [,] contained a short notice ~~a~~[the] meeting of the Royal Geographical in which some interesting were made in connection

[0011] a pretty theory, and an engineering , that the Zambesi which under very serious disadvantages of that , we have actually been navigating, not navigable at all. If our members will only believe we have a merry smile on our we would venture to move, the support of the theory, in fashion, that the word
ought to be inserted thus. "Wheat ought to grow at the level of the sea".
"Indigo ought not to grow more a foot high" and "it ought not contain indigo at all" "The seeds cucumbers and water melons
ought not to contain a fine bland [,] fit for purposes of the table" that would be like "extracting beams from cucumbers". "The
Zambesiought not to be navigable commercial purposes" and Steam Launch "Asthmatic"
"ought to have been intended to draw" more than merely "grist to the mill."

[0012]

~~It is a pity that Mr Laird volunteered a public assertion in direct opposition to his own official statement which we now have here in his own handwriting, for we go on the principle of breasting whatever difficulties we meet, and never blaming others if we should fail, and would have left un-noticed, the saving effected by putting a low pressure cylinder, to a high pressure engine, had he not publicly called for a public refutation on a matter of public interest. Instead of "intending the Launch to drawtow only." His words were "Dr Livingstone may calculate upon one ton for every inch of Displacement in the Launch, and as in the River he may safely lead her to two feet, from ten to twelve Tons will be available for stores and crew." Twelve kroomen bring her down to 2 feet 2 inches without any fuel, stores, or cargo; and instead of ten knots confidently promised in the same statement; a head wind holds her paddles so that even with sixty pounds of steam she is stopped even going down stream. Without coals, and it was only when left without this fuel, that we began to examine the matter ourselves, we can barely keep up with the heavy canoes of the Zambesi, and their speed equals the saunter of the lazy ploughboy.~~

If there ~~is~~[be] wind enough to a slight purl on the water, one ascending a river may dark blue lines stretching the stream. These by pilots are call "kwéttés", and the edge of the banks under . It may be observed that one bank or other of river is worn so as to be ; and that these parts alternate from side to the other at greater

[0014] less distances according to the of the current. the submerged are generally of a semilunar form the lower edge or part farthest the stream and this is invariably shortest

portion in the whole bank. lie diagonally to the direction of the , the angle of direction being less greater according as the river high or low. The Kwette is the part below the shoal edge of bank[,] and the importance of them[,] by the blue line and signs[,] may be judged of by the that while in the kwette you may from two to three fathoms to the very edge of the convex mass, onit you may not have one foot. formation of these banks it is to explain without drawings water actually rolls over and over towards the part of the bank upstream, and there lies the channel. The proper course is curve round [in] the kwette till the third of the submerged bank is

[0015] , then enter on the bank where have deep water along [towards and in] the side ~~by being~~[which is] cut perpendicularly. This often is miles in length called by the pilots "kokole". Sometimes semilunar banks are placed pairs, and the water between is very deep; but the furrow three or four fathoms ends a triangular shoal. The upper of one of the banks, on which our bright sunshine, a distinct shews the most water, to be chosen for getting out of deep channel before reaching shoal. My ignorance whether has been written on the , and desire to wipe out, an unmerited reproach an American author, the Rev$^{\underline{d}}$ $_{\underline{r}}$ Bowen, that our officers were of the laws which determine channel of deep water in the
Niger, are offered as excuses for these few remarks. If

[0016] succeed in inducing the better among your members to point out what has already done in describing the bottom rivers, or [in] working out the subject I have but touched on, I shall have incurred the charge of in vain. In July year we ran aground by going ahead . While in September the river was much , M$^{\underline{r}}$ Medlycott of H.M.S. seemed to know the kwettes & intuitively, and never at all.

The~~se~~ submerged sandbanks, on the Nile, are the greatest in Zambesi navigation. river has its own disadvantages. Mississippi has its snags, & it is said
~~and~~ requires vessels of a peculiar and only two feet draught. Hoogley has its own very peculiar of entrance & so has the place at Madras; But

[0017] are not impossibilities. great difficulty - the African , is, we hope, rendered formidable, and in spite the theory that Europeans live and labour in tropics, we find that hard , with the good food most supplied by
M$^{\underline{r}}$ Wilson of Glasgow, and merry heart, have secured fair a share of health as we have had in London.

From October 1858 to June
1859, 5782 Elephants tusks gone down the Zambesi Tette alone, of these thirds were large or upwards 50 lbs each, the weight of the were in round numbers
100 000 lbs. All merchandise carried in large unwieldy canoes

[0018] cost between £60 & £70 each loaded they draw about two and carry two tons at an of £10 sterling from
Quilimaine to Tette[,] when the is full. When the small between the Zambesi the Quilimaine river is [,] which is the case at least months in the year[,] the is much increased by land carriage to Mazaro. manufactured goods in a round about way Banian or Gentoo traders Bombay - and they are
~~able~~[obliged] to give ~~a~~ larger prices for than the Americans[,] are absorbing all the trade of Eastern Africa. Several Tette have been waiting at
Quilimaine for months in of American ships

[0019] cottons. For the information of men it may be added the American calicoes are , unbleached, yard wide cottons, at Quilimaine between 5$^{\underline{d}}$ & 6$^{\underline{d}}$ yard - and muskets, inferior English trade arms, from

26/ to 36/ each. With calicoes, and gunpowder, they secure all the trade on East coast below Zanzibar attempt is made to encourage native taste for better [,] which exists quite as here as on the West . Red and blue colours often unravelled, respun rewoven into country , and towards Lake the only scraps of these that come into the are exclusively claimed the chiefs

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