

EAST AFR. PROT

51546

REC'D
RECEIVED 3 JUL 15

51546

Parkinson,
Jw.

1915

4 Nov.

Last previous Paper.

46061

Water Reconnaissance
Report on Central Jubaland.Jds - copy of Report has been furnished to
the Secretariat, Nairobi.Mr Brabanty
Mr Read

This looks a useful report. I presume that, in accordance with the Survey Committee's recommendation, this report with the report already received and also a preliminary account of the geology will be combined with and published in the Col. Musc series.

I saw Mr Parkinson on Friday and he told me that he was at work on his specimens for the report scientific part of the combined report. As however he is probably leaving for Trinidad in a few weeks, it would be

Next subsequent Paper.

57231

as well to another affidavit from him
if you are not already doing so - how
the matter stands

J. M. G.

19.11.15

We have communicated the ^{letter} ~~letter~~ ^{report} ~~report~~ & resolution to him & asked him to forward
the draft report in accordance with
it. We need hardly do anything more at
the moment, but perhaps you'll be
brought up in 10 days?

He will in point of substance
have the printed folio as a small
first draft, though no binding will
be necessary for the Miscellaneous
Series.

We should try to get a short
time to send to Mr. Northcote for
comment, with a proof of the previous
report before he goes to Trinidad.

Dr. G. Fielder

See also his previous
report in Proc. ¹⁸⁹⁵ ~~1895~~ There too reports

& the further report about to be
preparing will be of great value
both from the admin^{ve} & scientific
points of view, & I think that
they sh^d be published as a Part 2 Paper.
As however, the first Report has
already

already been published in folio form
I think that, with a view to economy,
the rest sh^d also be printed & the whole
published in the same form. The folio
form will also be more convenient for the
shops otherwise, as proposed in Mr.
Northcote's minute.

62

We sh^d eventually thank Mr. P. &
express appreciation of his good work
- See Proc. ¹⁸⁹⁵ ~~1895~~
44982

Dr. J. P.

27.11.15

Referred. When I.O. answering are they can
be sent out for printing, & the printed
practical utility of your judgment
of expediency? Proc. 10.11.

I have spoken to Mr. G. Fielder
The cost of proof is not about £5
to judge from the case of the previous
Part 2 Report by Mr. [Name] [Page 50-55], the
cost will be ^{to a considerable extent} ~~to a considerable extent~~ ^{by the rule}
but we do not wish to set a bad
example. I've written Mr. G. I.O. 1st Nov.
& I shall the matter sh^d stand over
until the end of the year
at once
H. J. G. (15)

13th Nov 1915

Dear Sir,

In the reference to your call
 on to-day, I have pleasure
 stating that the footscap report
 herewith, the type-written matter,
 and about 6 extra pages, together
 with the two maps, would cost, if
 published in 8vo in the series of
 Colonial Reports, about £6.
 I cannot say if the Controller, who
 was away until next Thursday, would
 be able to print the last sheet
 of the report before the
 end of the year, R.

[Ch. 7050-16]
Colonial
Survey
Committee
Report for 1911

[Ch. 3828]
copy of the
of Africa
Department

No. of Copies
issued to

on the receipt of "Copy" for print
sent to the Colonial Office
responsibility of the printing
and it will be the duty of the
As you know every effort is being
made under the direction of the
Retrenchment Committee, to
suspend where whenever possible

in the fly-leaf you will find
details you desire as to the two
specified.

Yours faithfully

W. H. L. L. L.

Superintendent of Printing

H. J. L. L. L.

Colonial Office

260

Parliament

225

409

Colonial Office

783

276

Other Departments

371

350

Sales

260

1295

1239

50

136

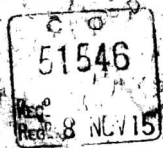
1375

1375

£18

Approximate cost

£90



65

Royal Societies Club,
St. James's Street,
S.W.

4th. November 1915.

Sir,

Water reconnaissance.

Herewith I have the honour to forward a copy
of the Report on Jubaland which has already been
handed to the Secretariat in Nairobi.

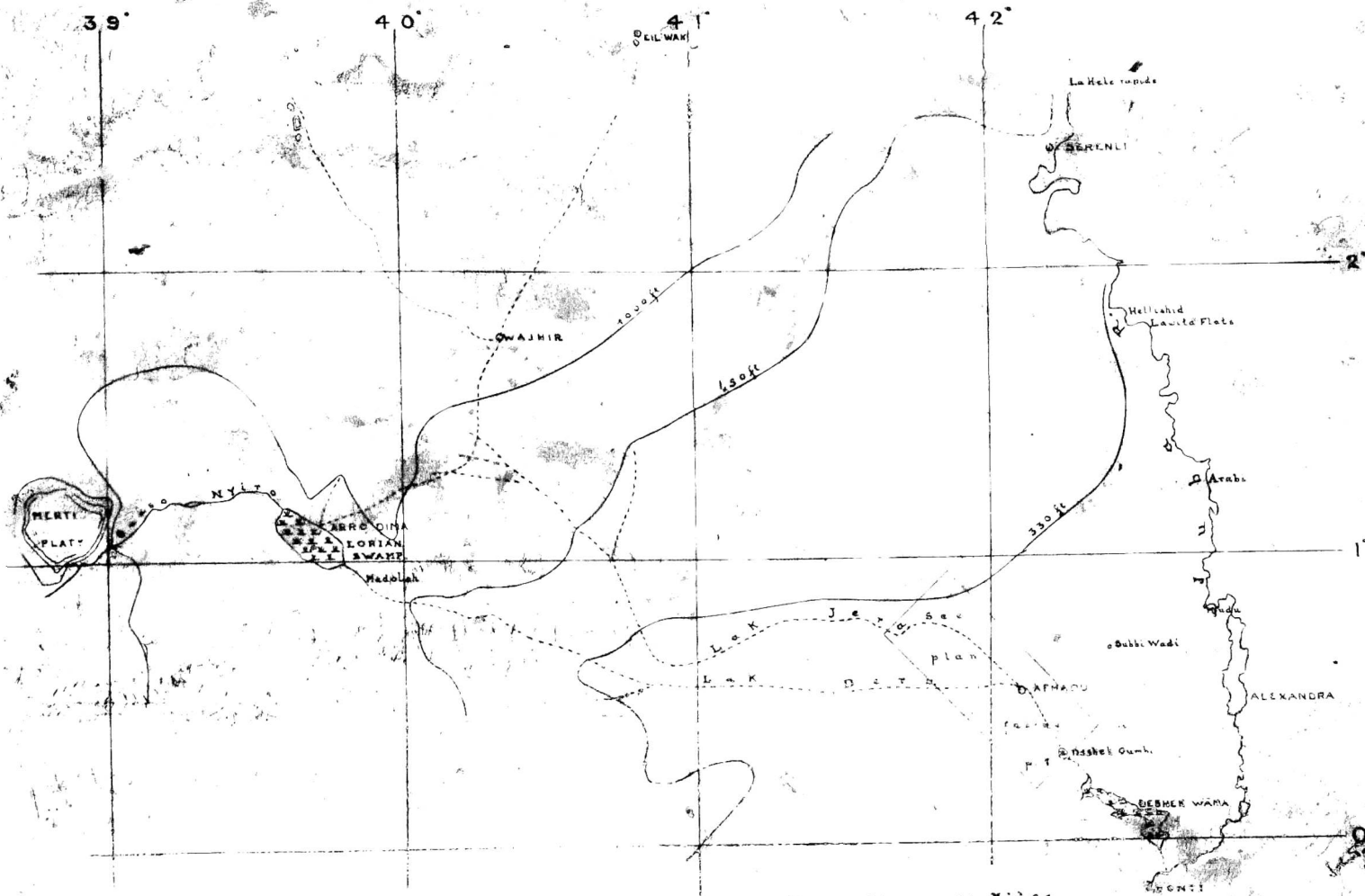
I have the honour to be,

Sir,

Your obedient servant,

John Parkinson

The Under Secretary of State,
Colonial Office,
S.W.



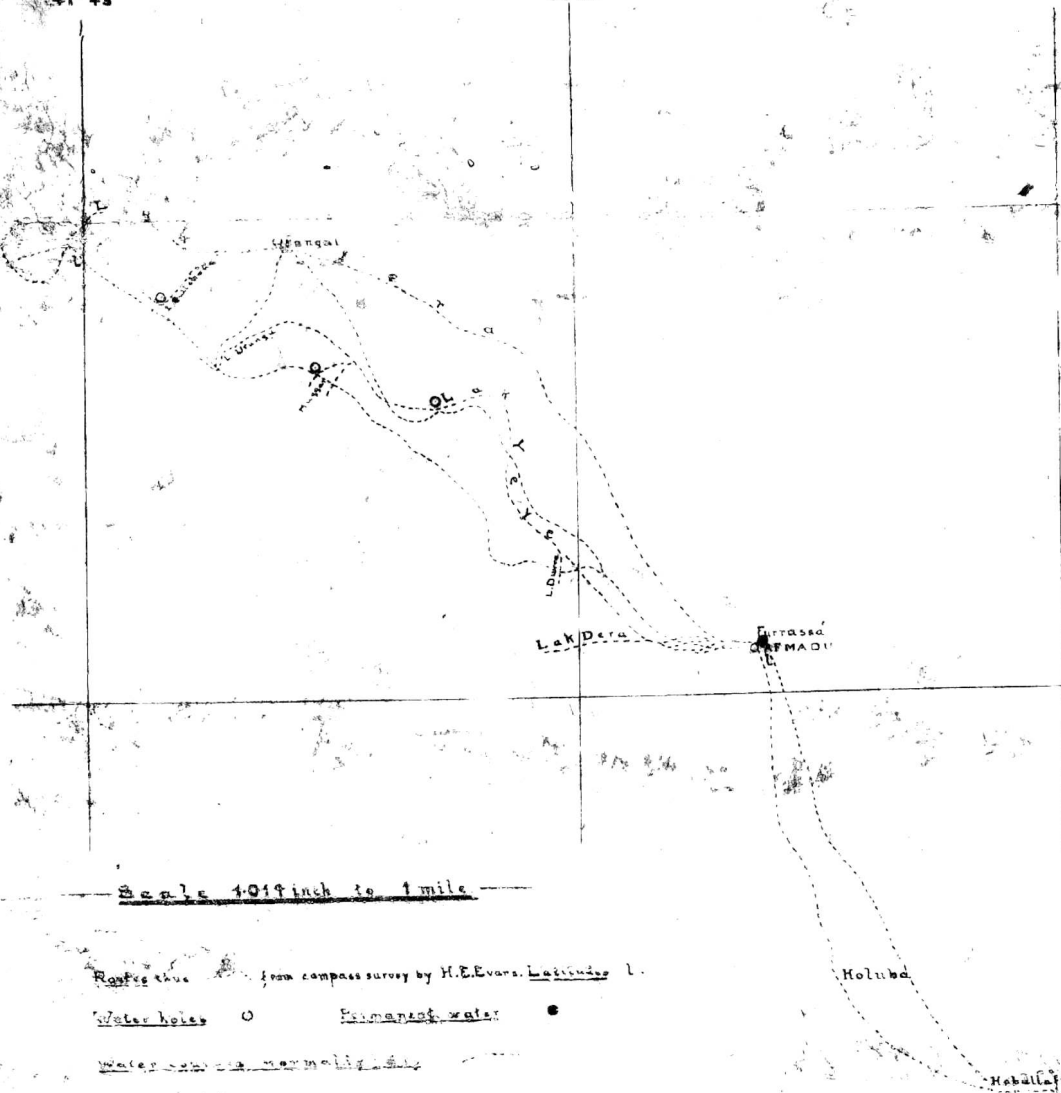
SCALE

41° 45'

42° 00'

5° 45'

5° 30'



Scale 1:01 inch to 1 mile

Route trace from compass survey by H.E. Evans. Latitude 1.

Water holes ○ Permanent water ●

Water scarce normally

DESIGN OURS

○ Kurrum waldum

Handwritten signature and date

WATER RECONNAISSANCE
REPORT on CENTRAL JUBALAND.

CONTENTS.

- 1) Route taken and General Structure of Central Jubaland.
 - 2) The Laks or Water Channels in the neighbourhood of Afmadu.
 - 3) Probabilities of supplementing the existing supply.
 - 4) Note on the Rainfall of Kismayu and Alexandra.
-
- a) General sketch Map of the District.
 - b) Sketch Map of the Laks west of Afmadu.
 - c) Chart of the rise and Fall of the Juba River for parts of 1913, 1914 and 1915.
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1) Route taken and General Structure of Central Jubaland.

Two expeditions were made in Jubaland for the purpose of seeing more of the great alluvial plain which commences at the Merti Plateau, includes the neighbourhood of Wajhir and extends eastwards to the Indian Ocean.

The first was a journey up the Juba River to Serenli and the La Helerapids; the second an expedition to the west of Afmadu.

From previous work it was known that a series of sediments consisting usually of sandstones occurred to the west of Eil Wak and which, sweeping round the depression in which the wells of that locality lie, extended towards Serenli, forming, as it were, the framework enclosing the great spread of alluvium to the south.

To avoid circuloctioin I termed these beds provisionally the Lakka Dima Series. (See Final Report on the Northern Frontier District. 17th. April 1915. p.17.)

On the present occasion these rocks were found to extend down the Juba as far as lat. $1^{\circ}45'$ N. (between Lawita and the most southerly Helliishid) and from Serenli were visible as very characteristic flat-topped hills for some distance beyond the La Hela rapids.

Expeditions from Serenli were not allowed, so that additional information was not obtained.

As far as examined along the banks of the River the Lakka Dima series consists of broken grey mudstones with some

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sandstones and thin beds of a limestone crowded with fragmentary shell remains.

Given a fair rainfall these beds should provide a moderate water supply.

Of greater economic interest is the occurrence at intervals, apparently occupying lower ground between the hills formed by the older rocks, of more recent limestones or of sands cemented by calcareous material, which are conspicuous at Serenli itself, to the north of Lawita Flats, above Arabi and elsewhere and which closely resemble the water-bearing beds of Waahir and Eil Wak. (See Final Report on the N.F., 17th. April, section facing p. 16.)

There can be but little difference in age, and the occurrence of such rocks over so wide a stretch of country as that between Waahir, Eil Wak and the Juba River suggests that they may occur at intermediate localities where, as at Waahir, they would prove of importance as a source of water.

From such evidence as I possess, it does not appear to me to be likely that these rocks will be found south of a line joining Waahir to Arabi on the Juba River, but west and north-west of Serenli permanent water would be valuable and, it seems possible, may be found if these softer and more porous beds can be located.

A well could, I think, be sunk through these deposits by digging or by a hand boring rig, but for the Lake Boma Series a steam plant would be necessary.

The second journey was from Kisumu via the Desher Gorge and the Deshek Gumbi to Afmadu and thence westwards along the Lak Jera in the direction of Waahir.

The character of the country was such as I had expected

4.

to find and it appeared to be both expensive and unnecessary to continue the expedition further, especially in view of the descriptions of the intermediate ground given by others.

This part of Jubaland is a glacially deposited or flat country, superficially formed of fine sand or silt, and monotonous in its characters and traversed by shallow lakes, i.e. by channels containing water only in the rainy season.

It rises very gently to the west and north.

The accompanying sketch map shows the relative positions of the places concerned, but must be taken as very approximate.

There can be no doubt that the alluvial plain of Central and Southern Jubaland as far westwards as the Lorian Swamp owes its origin to the raising of a portion of the sea bed, accompanied by the pouring in of sediment principally from the neighbourhood of the Merti Plateau.

During this time the coral reefs of the Coast were raised to their present position of 100-150 feet above sea level:

the corresponding submergence it should be noted would be sufficient to cover the country with water for a considerable part of the distance to Afmau.

Economically this point is of importance because the comparatively recent accumulation of detritus hides whatever of underlying formations may exist, although there can be, I think, no doubt that in the neighbourhood of the lakes west of Afmau a considerable thickness of alluvium and possibly some of older sediments would be passed through before the basement platform of crystalline rocks was reached.

5.

2) The Lakes in the neighbourhood of Afmadu.

As is sufficiently well known the northern Guaso Nyiro, after passing through the Lorian Swamp, emerges as a "narrow shallow stream" and finally dies away in a series of water holes at a locality named Madoleh. (1)

The bed of the River is thereafter known as the Lak Dera.

Dracopoli, who has studied the eastern end of the Lorian Swamp and the western end of the Lak Dera more closely than other travellers, states that, "After a plentiful rainy season water runs from the Lorian into the Deshek Wama", and adds, "At Afmadu the wells are dug in the river-bed, and the water supply is permanent. This would seem to show that there is an underground flow of water, and in my opinion there is such a flow from Madoleh eastwards." (2)

Elsewhere he says, "The Deshek Wama is a large shallow depression about 15 miles long by two broad, thus forming a natural lake. It was fed by a stream that issued from the Juba, and also, during the rains by the combined waters of the Lak Jera and Lak Dera" (3)

Sir Charles Eliot (4) quotes Tate's opinion to the effect

(1) Dracopoli, J.N. Geogr. Jour. Aug. 1913. p.139.

(2) Geogr. Jour. Aug. 1913. p.140.

(3) "Through Jubaland to the Lorian Swamp." p.75.

Dracopoli's statements concerning the Deshek Wama and Afmadu were presumably derived from native sources, as it does not appear that he himself visited either locality.

(4) "East Africa Protectorate." Arnold. London. 2nd Ed. 1905 p.70. See also Tate. Geogr. Jour. Feb. 1904.

"A Journey to Rendile."

that the Guaso Nyiro "really passes underground through
Factu, Afmadu, Gumbi and the Deshek Wama to the Juba, the
permanent water in these places being ^{otherwise} hard to explain."

Mr. G.F. Archer's opinion is diametrically
opposite.

In a report dated the 12th. of August 1914, he says,
"The interesting question of the connection (if any)
between the Guaso Nyiro and the Lak Dera ... still remains
to be determined, though it would appear, if the writer
may be allowed to hazard an opinion, that there is no outlet
to the Lorian, and that the River merely exhausts itself
in a succession of swamps in its lower reaches.

In support of which it may be stated that Captain Williams
R.E. proved by recent investigation that no water reached
the Juba River through the Deshek Wama into which the Lak
Dera was supposed to flow."

Captain Salkeld, in a Report dated the
5th. of April 1914, speaking of the wells of the Afmadu area
says, "All of these except Afmadu are surface wells and are
not always reliable, they however contain excellent water,
which appears to be supplied by the Lak Jira and Lak Dera,
but how far they depend on local rainfall is unknown.
The Afmadu wells are permanent and have been frequently
described. It is sufficient to say they are about 50'
deep dug on the banks of the Lak Dera not in the bed and
appear to tap a permanent underground supply furnished by
the Lak Dera or Lak Jira or both."

As he adds, the Lak Dera "is the water trough that
continues on from the Lorian and though it is a mystery
where all the water of the Guaso Nyiro disappears it may
be supposed to flow underground and appear in the Afmadu

wells."

The existence of sub-surface permanent water in either or both the principal Laks is a point of fundamental importance in opening a main line of communication from Kismayu either to Arra Dima or Waghif, but, as already remarked, throughout this part of the Survey, except the raised coral reefs fringing the Coast and the western end of the Deshik Nama, no solid rock of any kind was found.

This was disappointing, as a knowledge of what lay beneath the extensive alluvial plain of Jubaland would have been of the greatest value in forecasting the probabilities of the future water supply.

With the exception of the wells at Afmadu, which are 50 feet deep, as Salkeld says, and are dug in the soft, slightly micaceous silt of the River bank, I saw nothing in the district that deserved to be called a well: the pits at Muggar, Pangal, Gulcher and Yeye are the slightest of excavations occasionally about 15 feet deep but usually much less.

At the time of my visit to Afmadu the wells were empty, i.e. had not been cleaned out in preparation for the dry season and the Somalis were obtaining their water from the rainpools scattered throughout the neighbourhood.

One of these, the size of an average English horse-pond was situated a few yards from the wells.

Much of the rainfall is no doubt held up in this manner by the clayey surface, and, besides pools, is there evaporated.

Favourable conditions of porous soil

(5) It is only after the failure of the rain-pools that the Mohamedanis return to Afmadu and clean out and deepen the wells to the water horizon.

8.

and heavy rain at intervals would allow of a still larger proportion of the fall being absorbed.

The country is so uniformly flat that the numerous small streams leading to the Lakes appear to be ~~run~~ ~~out~~ ~~the~~ ~~side~~ ~~of~~ a large proportion of the rain-fall enters the ~~ground~~ ~~as~~ ~~a~~ ~~run-off~~.

Thus, heavy rain was met with in the middle of June near the Desha's Kama, converting the paths into miniature rivulets running rapidly towards the swamp, which undoubtedly receives the greater part of the supply. The beds of nearly all the Lakes in the Afzadu

area are ill-defined, e.g. the one west of the wells at Afzadu consists of small channels which might easily be crossed without the observer being aware that he was in the neighbourhood of a formerly important watercourse.

The belts of bigger trees which mark the banks of the principal lakes are the readiest indicators of their positions.

About 35 miles N.N.W. of Afzadu, the farthest point reached by the Survey, the Lak-dera was crossed in two places, separated by some 5 miles of channel, at both of which water was flowing and in one was about two feet deep. On the following day the Lak-dera was again seen at Fargal, about 12 miles below the most easterly of the two localities mentioned. Here rain water was abundant in surface pools, but, as at Afzadu, the deeper pits and water channels were dry. Possibly the water seen farther up may not have had time to reach Fargal, but I incline to the opinion that it sinks rapidly into the ground.

On the Lakes seen there were no signs of a regular annual flow of water.

9.

I conclude accordingly,

- 1) that such a flow of water as was seen in the Lak Dera is maintained for a relatively short distance, when the water is absorbed and continues to percolate along the channel for a shorter or less distance, dependent on the slope and the nature of the soil of the strata traversed, and
- 2) that the permanent water at Afmadu taps such a supply, its position near a confluence of Laks having been chosen possibly for this reason.

Mention should be made of the two swamps (Deshek) into which the Lak Dera successively passes after leaving Afmadu. The Deshek Wam (about 12 miles north of Yontfi) the larger and more southerly of the two, is an irregular grass covered swamp with a well-marked bank consisting, at least on the western side, of "coral", similar to that of Yontfi and Gobwen.

There is, I think, little doubt that it is an old arm of the sea.

The swamp at Gumbi (about one mile N.N.E. of the camping ground known as Kurruxi-wallduner and roughly 24 miles S.E. of Afmadu) appears to be about $1\frac{1}{2}$ miles long by about $\frac{1}{2}$ mile broad. It was full of water when I saw it.

As in the Deshek Wam the centre was a mass of grass and weeds, a spot called *Saxifraga*, about 5 miles N.E. of Gumbi on the Afmadu track, bears evidence of frequent running water, which in one place was actually flowing when the Survey passed it on the outward journey.

The Lak Dera here is quite close to the track and the locality appears favourable for wells.

I am indebted to Mr. F.R. Filleul, Acting District Commissioner

10.

at Alexandria and to Mr. Rattray Gardiner of the Department of Public Works for information concerning the ground lying west of the Juba River from Mfudu southwards.

There appears to be no doubt that a number of channels and depressions exist in this part of the alluvial plain of the River, that they are frequently filled during the flood season and that in all probability water is supplied to the Deshek Wana and the Deshek Gumbi by this means, while it seems at least possible that a certain amount may reach Afadu via the locality known as Subhi Wadi.

Taking this into consideration, together with the fact that, as far as measured, the rainfall at Alexandria is considerably higher than at Kismayu, there seems strong probability of water being found by sinking throughout the triangle of country contained between Mfudu, Afadu and Yonti.

3) Probabilities of supplementing the present supply.

I see no reason to suppose that a permanent supply of water sufficient for the needs of an ordinary "safari" would not be found by sinking shallow bore-holes anywhere along the banks of the principal Laks.

The permanent water at Afadu and the number of shallow pits which have been dug at Fangal, Muggar and elsewhere to the west, periodically at least productive, go far to prove that such is the case.

The amount of labour expended by the Somalis in cleaning out or deepening the pits they have constructed is very small; for instance the Mohammed Zubir at Yeye informed us that some slight excavations in the neighbourhood of the

11.

Lak had contained no water for four years

These depressions were but a few feet deep; it can scarcely be doubted that, had they taken the trouble to dig, water would have been obtained.

Apart from the River, the actual and potential water resources of Jubaland may be thus summed up.

- a) The Deshek Wama.
- b) The Deshek Guabi and the neighbourhood of Haballofua.
- c) The increased output by development of the Afadu wells.
- d) The probable production of a small permanent supply by sinking comparatively shallow wells along the banks of the Lak Dara to Arro Dima and along the banks of the Lak Jera to Wajhir, and
- e) the location of additional occurrences in the north-central parts of the Province of soft calcareous sandstones and limestones resembling the water-bearing beds of Eil Wak and Wajhir. If found, these should provide a certain amount of permanent water comparable in quantity with that obtained at the localities named.

Owing to expeditions outside Serenli not being allowed, I was unable to make additional observations.

4) Note on the Rainfall of Kisumu and Karisuma

(As given in the Meteorological Records up to and including 1913, the rainfall at Kisumu has a mean average value of 15.14 inches taken over a period of 18 years.

During this time the maximum fall for any one year was 29.53 inches, the minimum 6.68, giving a difference of 22.85 inches or a range, taking the mean annual fall as unity, of 1.54. This compares with an average of 1.24 from 13 stations given by Binnie for rainfalls under 20 inches observed for a total of 576 years. (6)

In the Kisumu records, 44.5% are above and 55.5% below the mean, a proportion which, as far as it goes, agrees very closely with Binnie's average value of 45% and 55%.

At Kisumu the average fall of the ten dry years was 11.10 inches, or 73.4% of the mean value, that is to say, for 55.5% of the years gauged the rainfall was 26.5% under the mean annual value.

Taking two or three consecutive years of low rainfall the results were practically identical.

Owing to the small number of observations these figures cannot be considered as more than approximately accurate, but they show at least that a shortage of over 25% on the mean annual rainfall is to be anticipated.

(6) "Rainfall, Reservoirs and Water Supply," Sir Alex.

Binnie. London, 1913, pp. 15-16.

It is, however, to be noted that the rainfall at Alexandria, ON THE RIVER (Guba) for 1911 - 1913 inclusive has an average value of 24.34 inches and apparently bears no relation to the rainfall at Kismayu.

No records are kept at Serenli, but the Clerk at the Station promised me to undertake the work if I would send him the guage belonging to the Survey.

This I have done.

I have also to state that Mr. H.E. Evans, while attached to the Survey has prepared a sketch map of the route taken from Yonti to beyond Afmadu.

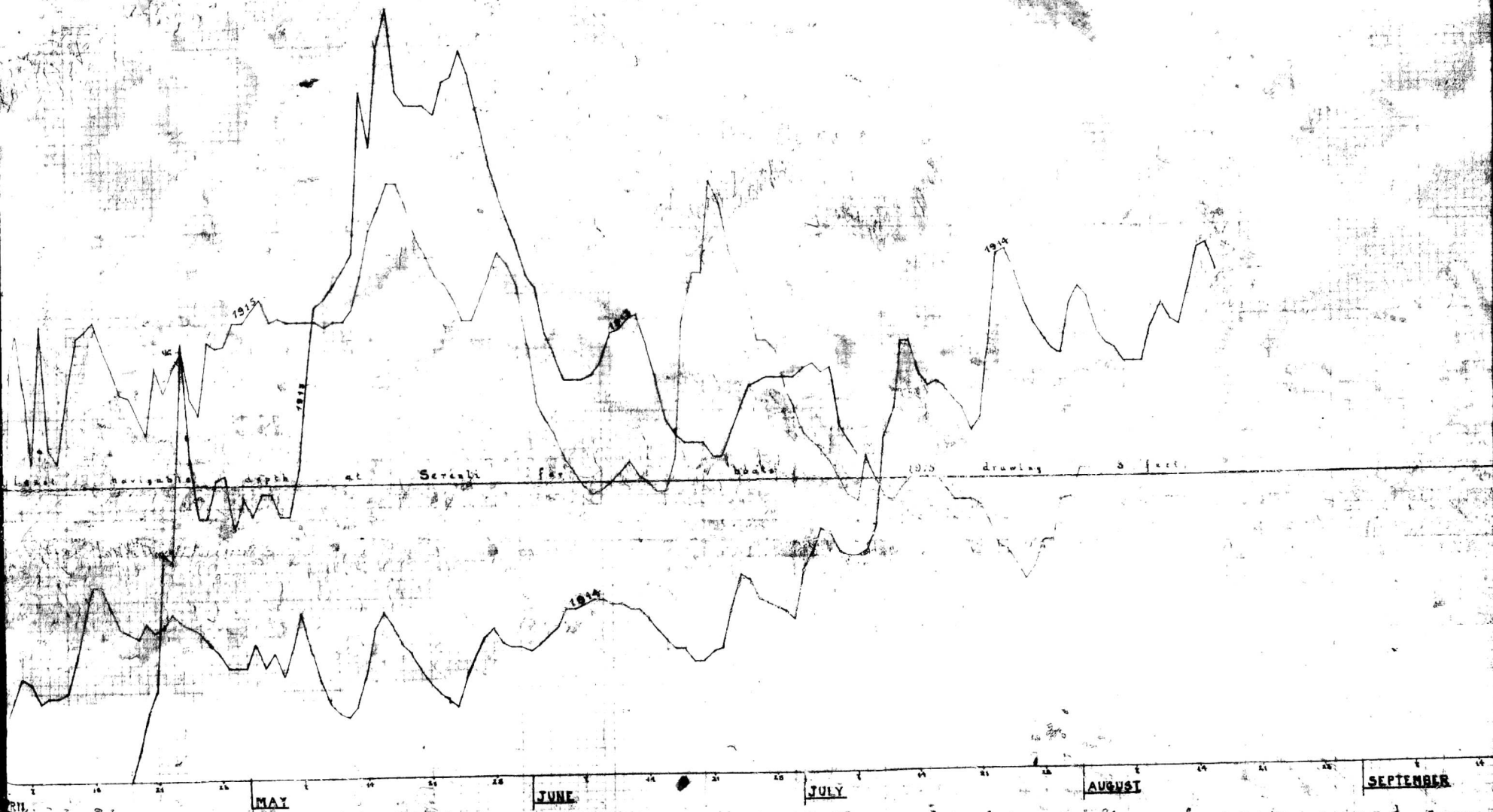
The prismatic compass work was checked by three or four latitudes, and the map should be the best yet made of this part of the Protectorate.

Note on the Chart of the Rise and Fall of the Juca River at Serenli.

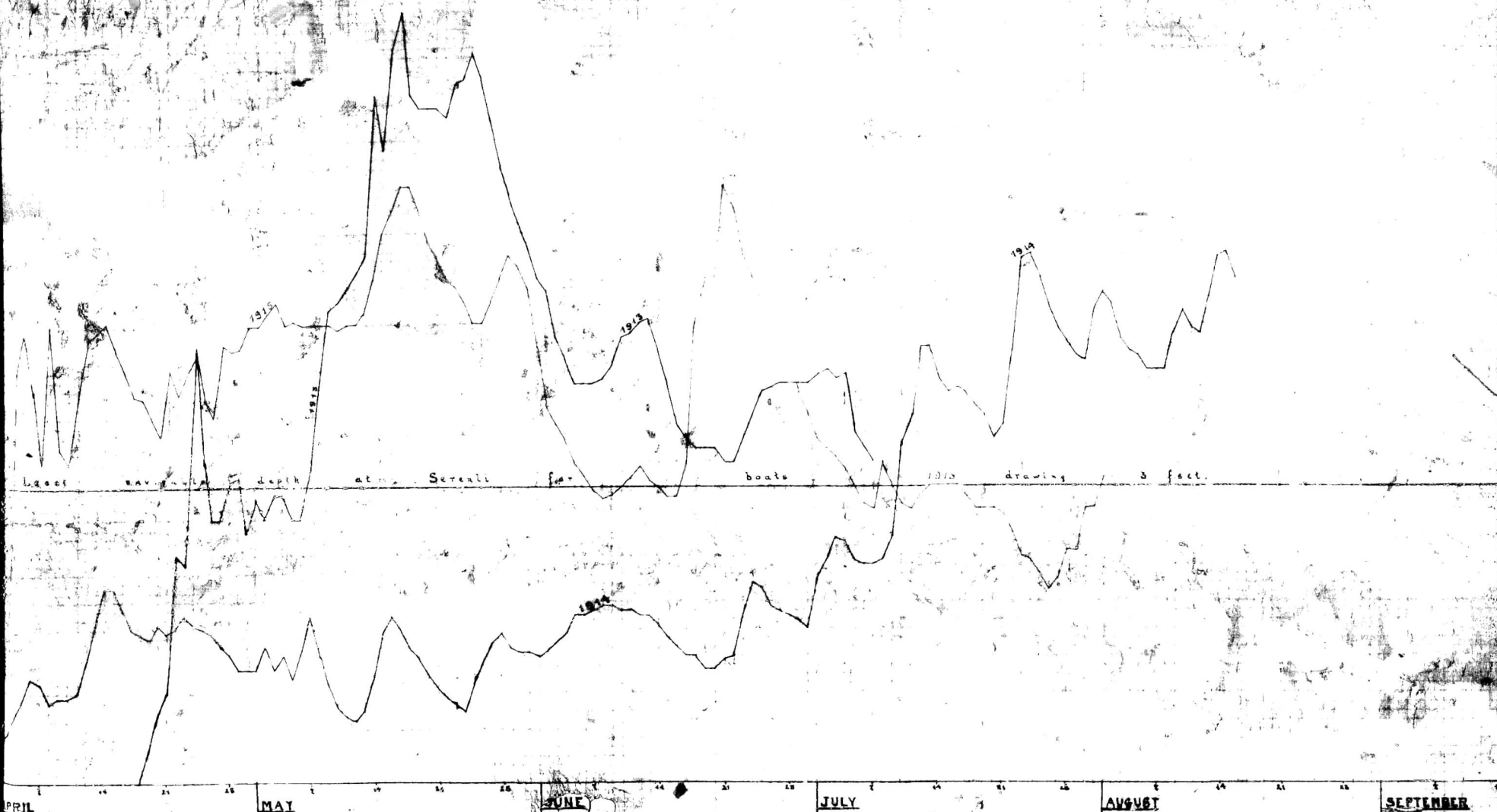
The figures are taken from a guage at the River bank: a zero reading does not mean that the River is entirely dry.

At Lawia Flats and Hablagaba the height of the water is rather some four or three feet less than that at the same time registered by the Serenli guage, hence a reading of 5 feet 6 inches is necessary there before navigation up and down the River is certain, assuming that the boats employed draw three feet.

John Parkinson
1915



Variation in level of the Indus River at Sarsuli for parts of 1913, 1914 and 1915.



Variation in level of the Lake River at Sevenli for parts of 1912, 1913, 1914 and 1915

S. C. ...

1948

3 feet

AUGUST

SEPTEMBER

OCTOBER

r parts of 1943, 4 and 5

K. ...