



EAST AFR. PROT.  
No. 33235

DESPATCH

33235  
16 SEP 05

No. 489  
1905

(Subject.)

### Increases of Protect.

Transmits report by Col. G. E. Smith R.E. of Anglo German Bd of Comm. on, with suggestions for the future. Concurs and urges that proposal surely be sanctioned. Differs from Col Smith in his estimates of expend. - Further as to staff and app. hereon. Please to hear as soon as possible whether proposals can be met or not.

Not Read.

This has been printed & proofs circulated, but I delayed the reproduction of the graph and map until now, not to delay action.

? Has it considered in Colonial Survey Committee before applying to Treasury. There is not much time to be lost if provision is to be made in this year's estimates & if the new Dept. is to be created at once it may be necessary to authorize the inclusion of the provision in the Estimates before going to the Treasury.

Copy of 4 and 6 Comm. of 47  
and 2 Vol 18 Nov. 1905

W.B.S.  
2/10

at once  
W.B.R.  
5/10

Dpt. W.B.S. in  
subcom. instructions  
W.B.S.  
18/10

40296

34235  
Commissioner's Office,  
6 SEP 05

2219  
Mombasa,

August 16th 1905.

AFRICA PROTECTORATE.

No. 169

Sir,

With reference to your telegram of May 4th, I have the honour to forward herewith a report, by Colonel G. E. Smith, R.E., of the Anglo-German Boundary Commission, on the surveys of this Protectorate, with suggestions for the future.

2. I concur with all Colonel Smith says in this report and cannot too strongly urge that the survey, as proposed by him, be sanctioned. An adequate survey is in my opinion absolutely essential for the pacification of the country. The expense is considerable, but as it will be spread over at least three years, I hope the money will be granted; a small proportion will be covered by revenue derived from survey fees.

3. I am very much in favour of the separation of the Land

Principal Secretary of State

for the Colonies,

Downing Street,

LONDON.

and Survey Offices. If you approve of this, I have  
the honor to recommend that Mr. Barton-Wright be  
appointed Land Officer, whilst Colonel Smith himself  
would probably be as good an Officer as could be obtained  
for the post of Surveyor General. It would be necessary  
for the present constitution of the staff of the two  
departments to undergo a slight alteration to meet the  
proposed change and some additional men would be required.

4. There are several items in Colonel Smith's schedule  
of proposed expenditure which I consider unnecessary.  
These I have marked with an asterisk. I also think his  
seventeen per cent for contingencies is too much; ten per  
cent would be probably sufficient. The pay proposed for the  
different military officers to be employed on the survey  
seems high, but I believe this pay is laid down according  
to rank for employment in the Colonies. Travelling  
allowance is asked for all Royal Engineer officers,  
but as the rate of pay they would receive is so high, and  
as their duty is outdoor work, I am of opinion that it is  
unnecessary to grant this. The same applies to quarters.  
Surveyors' work is in the field, but when at Headquarters  
they would have to be provided with quarters, or if none

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4. There are several items in Colonel Smith's schedule of proposed expenditure which I consider unnecessary. These I have marked with an asterisk. I also think his seventeen per cent for contingencies is too much; ten per cent would be probably sufficient. The pay proposed for the different military officers to be employed on the survey seems high, but I believe this pay is laid down according to rank for employment in the Colonies. Travelling allowance is asked for all Royal Engineers officers, but as the rate of pay they would receive is so high, and as their duty is outdoor work, I am of opinion that it is unnecessary to grant it. The same applies to quarters. Surveyors' work is in the field, but when at Headquarters they would have to be provided with quarters, or if none

were available, rooms would have to be rented. Under the item "Buildings", a store for storing all the survey material would be wanted at once and should be allowed for; this is not included in Colonel Smith's estimate. The present buildings of Land and Survey department, are utterly inadequate both for the officials to perform their duties in and for the convenience of the public. They are built of wood and iron, and in consequence liable to catch fire. If such a thing were to happen, it would entail a great loss to us as all correspondence regarding land grants, and all maps, surveys, &c. would be lost. A new building of stone suitable to the requirements of the present day and for the future should be certainly erected as soon as possible.

5. Under the cadastral survey Colonel Smith estimates five hundred pounds and two hundred and fifty pounds for stone buildings as offices for the Land Department at Nairobi and Mombasa respectively. Such buildings could not be built for the sum named; and one thousand pounds and two hundred and fifty pounds for survey offices at Nairobi and Mombasa would be required. I think the Land and Survey offices should be under the same roof, though quite separate, as the departments are so closely linked together in their work. This arrangement

271  
would also be of great convenience to the public who  
could transact all business connected with land in one  
building.

6. I should be glad to hear as soon as possible whether  
this scheme for survey, &c. will be entertained, in order  
to enable me to make provision for the necessary amounts  
in the estimates.

I have the honour to be,

Sir,

Your most obedient,

humble servant,

J Stewart

33255  
16 SEP 05

Nairobi,  
July 30th, 1905

278

Sir,

In accordance with your directions I have the honour to transmit the following report on the surveys of the East Africa Protectorate.

It will be found that the report commences with general remarks. I then proceed to report in detail on the questions which I had the honour to specifically receive from you. Certain other suggestions follow.

Technical details, estimates &c, are relegated to appendices. Whilst a blue print map shows approximately the areas in which it is proposed to operate.

The whole may shortly be summed up as follows: The Surveys in the past have been inadequate, worked with an inadequate staff, in a haphazard manner with a consequent increase of arrears of work and delay in registration of Land. Whilst an accurate and general map, useful for all purposes has not been produced.

The past inadequacy and delays are to be attributed to lack of funds; and to the commencement of the Land settlement before the survey.

The

L.M. Commissioner  
& Commander-in-Chief,  
East Africa Protectorate,  
NAIROBI.



The department seems to have carried out its work as well as possible with its inadequate funds.

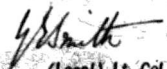
The recommendations made by the department have been on correct principles and would, if granted promptly, have gone far to meet the case.

It will be seen for the most part my report is a restatement of the case already embodied in your last estimates but not granted. The only important difference is that I recommend that more work should be undertaken and that it should be accelerated the employment of larger numbers. In other words, I recommend the expenditure of £70,000 in a shorter time. In matter of details variations occur. If only the part estimated for by Mr. Waring were undertaken, my estimate comes to £30,400 instead of £32,000. Some increases are recommended in the annual estimates.

The expenditure recommended should be considered as capital expenditure for the development of the country. It is very small when compared with the capital sunk in the Uganda Railway. Nor must it be forgotten, that a large part of it will be repaid by survey fees as the land becomes occupied. Moreover such expenditure will certainly help <sup>to make</sup> the Protectorate self supporting at an earlier date than would otherwise be the case.

My recommendations regarding land are made with some diffidence since I am not a land expert. It is however impossible to avoid touching on that subject, so intimately is it connected with survey.

I have the honour to be,  
sir,  
your most obedient, humble servant,



(Local) Lt. Col.  
and Capt. R.E.  
N.W. Commissioner  
Anglo German Boundary,  
Uganda.

Report on Survey East Africa Protectorate.

I commence my report by stating some of the reasons why an adequate survey is a necessity in this protectorate and some of the economies and advantages to be expected from it.

(a) Administration and Political. *Stat*

Major Hills in his report on the survey of Canada, on page 5 (a) states: *that good maps are required*

(a) ADMINISTRATION AND POLITICAL. *Stat*

"In all questions relating to the administration of public lands, the sale and transfer of such; the setting out upon the ground of provincial, township and other public boundaries; the valuation of property for the equitable adjustment of sales, taxation and assessment; the administration of public works, such as canals, reservations, parks and high ways; the reclamation and improvement of waste lands, and as base for all statistical purposes for the geographic representation of facts relating to population, industries, products and similar information."

The whole of the above quotation applies to the case of this Protectorate.

(b). Military. *Stat*

"For military purposes such maps are invaluable in peace and necessary in war". I quote from the same authority. Taking a large instance it is unquestioned that a good map of South Africa would have saved many thousands of lives and many millions of money. Taking a small and imaginary case;

suppose

suppose that it became necessary to make a punitive expedition from Karungu against the tribe of Butende, situated just north of the Anglo-German Boundary and 30 miles from the Lake Victoria. A year ago it would probably have been thought necessary to send two companies for the purpose, whereas <sup>with</sup> the maps recently -- constructed before him, it becomes obvious at once to any one that one company would be ample for the purpose, seeing that the map shows at once the small extent and weakness in numbers of the Butende. The transport and consequent cost becomes at once halved, whilst the distances and marches are at once obvious. Before the map was made considerable margin would have to be allowed owing to uncertainty of the times and distances which were involved in the march.

(c) Engineering and Economy

As preliminary maps for planning railroads, highways, electric roads, canals, aqueducts, sewerage, drainage and water supply schemes. In all such works the cost of preliminary surveys is thus saved.

For showing the extent, location and accessibility of lands, waters, forests and valuable -- minerals.

As base maps for hydrographical, geological and mineral surveys."

The general argument is further developed by Major Hills.

I now turn again to (a) which I propose to examine at greater length. The Protectorate was opened to settlers early in 1905, previous to the construction

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construction of any systematic map or the establishment of a Survey and Land Department. In consequence long periods have elapsed between the application of a settler for land and the completion of final deeds. The settlers have complained bitterly of these delays and there is much justice in their complaints. I refer for a mass of evidence and comment on this point to the "report of the Land Committee" of May 1905. It will be seen that my recommendations agree in most points with those of the Committee. Such differences as remain are technical survey questions.

In order to arrive at a better idea of the delays which have occurred in the past, I requested the Land & Chief Survey Officer to furnish me with particulars of 60 cases taken at random among those registered during the last year and a half.

By a reference to Appendix I. it will be seen that the average time elapsing between the date of application and date of registry has been over the whole period 12.6 months, whilst a glance at the same data diagrammatically plotted shows that the delays tended to increase rather than diminish. It should be noted that provisional occupation has been granted in many cases previous to the completion of registration. But there is no doubt that the settler is kept waiting much longer than necessary before even that can be granted under present conditions, -- a considerable hardship to the man of limited capital who finds much of it spent whilst he is waiting. No doubt the time taken could be considerably reduced working on the present system by increases of staff etc. I now describe the present system showing how much

which time would be taken under the most favourable circumstances, that is to say, if no delays occurred through press of work. I compare the same with what should occur if a proper survey existed and estates were marked before selection.

	average as now if no delays	average as should be with adequate survey.
Order applies - application to the Sub-Commissioner - local objection such as native reserves - returns to office	14 days	0. Not necessary if native reserves are entered up on maps.
Instruction for survey is issued - survey in the field - work marked and traced	30 days	1 day marking of office maps & cutting out portion of printed maps required special cases 20 days
Order to Crown Advocate at Bombay - instructions for draft agreement	14 days (could be reduced to 3 days if conveyancer in Land office)	1 day say in 90% if normal printed agreements accepted, special cases same as now 14 days
Agreement to applicant	14 days	0. (if normal printed agreement is accepted) special cases as now 14 days
Agreement to Crown Advocate - endorsement and return	21 days, if conveyancer in Land office 4 days	10 (if normal printed agreement) special cases as now 21
H.M. Commissioner for execution - to applicant for execution - Registration by Sub-Commissioner	8 days (provided H.M. Commissioner is not absent on duty. It is suggested power be given to some person (the Land Officer?) also & on the spot to execute)	3 days (since applicant can execute normal printed agreement at once)
Notification on ground - applicant and surveyor	0. Done in progress of survey	14 days
Final	101 days - if conveyancer in Land office 73	30 days - in 5% of special cases say 76 days.

In other words at present it takes on the average over 12 months to complete registration. This might with the existing system be reduced to about 3 months, whilst with proper maps 95 per cent would take about one month.

But whilst the present system continues no general and accurate map useful for other purposes would be produced, whereas with the system recommended maps for all purposes would become available.

It is a point of great importance to remember that every measure taken to facilitate land settlement makes the day nearer on which the Protectorate becomes self supporting.

We now reach the question what is the proper survey, which I have claimed will be of such great value? There is of course no doubt that a survey carried out with the greatest care and the most refined methods is necessary in many cases. Every great nation has carried out one or more. But there does not seem in the present case any such necessity either now or for a long time to come.

What is required is :

(a). A good secondary system of triangulation over such parts of the Protectorate as are likely to be settled soon, which shall form a framework on which subsequent mapping may be fitted.

(b). A tertiary system of triangulation (in which less accuracy is demanded because errors in this case are not cumulative) must follow.

(c). A general map, for which a scale  $\frac{1}{100,000}$  or 0.63 inch = 1 mile is recommended, made by  
plants



planetable with approximate contours.

(d). In parts where estate plans are immediately required a cadastral survey on a scale of  $\frac{1}{10,000}$  or 6.3 inch = 1 mile. This should always be prepared in advance of land settlement.

(e). In townships a plan on a yet larger scale of  $\frac{1}{2,000}$  or 25.4 = 1 mile.

For the present there is required a belt of secondary triangulation from Mombasa to Kisumu on the Victoria Lake (400 miles), this would be connected at the latter place with the triangulation of my present Boundary Survey, a second connection would be established southwards from the Athi Plains or along the Rift Valley ( 60 miles ) and a third in the neighbourhood of Teita ya Bura (30 miles ).

A secondary chain would diverge towards Kenia from the main one near Hairebi joining the former again via Baringo and the Rift Valley. (160 miles).

A secondary chain is required along the coast from the German Boundary to Lamu (160 miles). The total of secondary chains becomes 900 miles.

A tertiary system would be required over all this area and extended outside of it to form the frame work of the mapping. ( 36,000<sup>sq</sup> miles).

Mapping on the  $\frac{1}{100,000}$  should be undertaken over a belt of country, coloured pink on the blue print map herewith, extending 20 miles on each side of the railway and for 20 miles inland from the coast. Whilst the extensions towards Kenia and to

join my Boundary Commission maps should also be mapped on this scale ( 36,000 sq miles).

Certain areas, coloured vermillion on the map, would be mapped on the larger 10,000 scale in the districts in which settlers are actually being located. And any plans of estates made outside these areas would contribute to this work, as they would with triangulation in existence always be tied together and adequately checked. I contemplate this work being done by the existing staff which becomes "Cadastral Survey Staff".

On the 2,800 scale the following townships would be taken in hand :

Mombasa, Nairobi, Naivasha, Nakuru, Kisumu. The work at and near Mombasa is the most considerable and important. It is also the most difficult as the ownership of land there is already complicated. This work also falls to the " Cadastral Survey Staff". A branch office of both Survey and Land will be required in Mombasa.

Such maps would meet present requirements fairly well. But it must not be forgotten that, by the time the work at present estimated for is approaching completion, larger extensions of the work may be necessary. It seems that the parts of the country over which extensions should be contemplated, being these best suited for settlers, are:

- (a) The northern and eastern slopes of Kenia.
- (b) Between Kenia and the Athi River.
- (c) The continuation of the Mau Plateau northwards commonly called the Gwaso Ngishu and Kamasia country.

(d-

14

(d) Southwards the continuation of the Mau west of the Rift Valley towards the German Boundary.

(e) A considerable tract of little known country comprising the Isouria Escarpment, Kisi, Setik, Lumbwa and the Mara river valley.

Considerable developments in the fibre production are quite possible which might involve the necessity of survey extension along the Sabaki river and possibly also the Tana and Juba river.

It is not worth while at present to estimate for such extension, I wish however to record my opinion that large extensions will eventually be required.

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REORGANISATION OF DEPARTMENTS.

I consider that the best method would be to separate the "Land and "Survey".

The organisation would be as follows:

Surveyor General (Major or Senior Captain R.E.  
Local Rank Lieutenant-Colonel).  
1 clerk & accountant. A Sargt-  
Major or Sergeant.  
1 junior clerk military

Secretary Trigonometrical  
Survey.  
1 Captain R.E.  
2 Subalterns R.E.  
Working with Surveyor  
General 2 parties.  
1 clerk

Minor Trig  
Survey  
2 Subalterns R.E.  
probably with 2  
Asst. Surveyors  
from Cadastral survey ?  
4 parties.

Topographical  
Section  
1 Subaltern R.E.  
2 Sergeants R.E.  
6 junior NCOs R.E.  
2 draughtsmen

-----  
Chief of Cadastral Survey  
-----

Office Existing staff Licensed  
Existing of Asst Surveyors surveyors  
Staff ( 2 extra )

-----  
Land Officer  
-----

Conveyancer  
Clerks

1 Asst Land Officer  
Clerks

Asst. Land  
Officer  
Mombasa

Accountant

I do not however report on this office in detail.

I consider that the Land Officer is in a better position to estimate and report on this subject than

I.

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The Surveyor General would usually be at work in the field on secondary triangulation work, he would however have to inspect generally, and perhaps his presence at Head Quarters Vis Mairabi might be necessary 3 or 4 times a year. He would only teach the general principals of land and leave the Chief of Cadastral Survey a large amount of responsibility. After the secondary triangulation is completed he would spend more time at Head Quarters.

The Chief of Cadastral Survey would take charge of Head Quarter Offices and one of his most important duties would be to keep in immediate touch with the Land Officer, in arranging estate surveys according to his requisitions and undertaking cadastral work in such districts as may be opened from time to time.

It will be noticed that the Trigonometrical Survey and Topographical work would be on a military system whilst the cadastral survey would be civilian. This in accordance with precedent, and would utilize existing arrangements to the utmost. Royal Engineers for the military part are ready trained. It will be seen that I make an exception to this in my proposal to employ 2 Assistant Surveyors from the cadastral branch on minor triangulation. I do so because I think that it would be advisable to ensure continuity in methods of work in view of the eventual removal of the other branches on completion. Also because it would facilitate cadastral work if some of the Assistant Surveyors have been employed in the parts about to be surveyed. It would save time in finding marks

marks made &c.

It should be noted that in view of the correspondence concerning Military Survey party cancelled by a <sup>later</sup> letter and especially Treasury letter No. 1755/06 of 30th January 1906, it is evidently contemplated that a portion of the cost of a survey should be borne by Army funds. I doubt if this would be granted unless the Trigonometrical and Topographical Survey is on a military footing.

ESTIMATES.

In Appendix II. will be found an estimate based on the work done by the boundary Commission and checking the estimates already sent in by Mr. Waring. In Appendix III. estimates are prepared for the whole of the Trigonometrical and Topographical work recommended by me. The area which it is contemplated to cover is shown on the blue print accompanying this report.

In Appendix VI. estimates are proposed for the Cadastral branch. These latter estimates are not made out in detail. Since the new "Cadastral branch" is the present survey branch renamed, and these increases are required in any case. I consider detailed estimates should be made out later by the Chief Surveyer.

Appendix II. & III. therefore are independent estimates checking one another. It will be seen that the same total of £70,000 is obtained by altering the margin left for "unexpected delays, contingencies &c," from 18 per cent to 16.9 per cent. The discrepancy is not large.

These estimates are not in the annual form. I consider that greater economy would result by the sanction of the whole sum and the carrying forward yearly of unexpended balances. The operation is similar to large building operations. Economy results by pressing on with the whole work as rapidly as possible. It may be thought that the margin of <sup>17.6</sup> 20% allowed for ~~delays~~ delays is too large. In this country it is not possible to estimate within narrow limits.

some 74

Some of the most frequent delays, all varying considerably, are as follows:

- (1) Delays in obtaining labour.
- (2) Extraordinary Drought or rain and consequently famine or plenty and clearness or thickness of the atmosphere.
- (3) Military expeditions or unfriendly natives - especially to be expected in the region of Nandi and Lumbwa between the River valley and the Lake. The whole state of affairs may be quite different 1 year hence.
- (4) The price of food &c.

I consider it very important that power should be given to the Surveyor General to reallocate funds from one subhead to another. He has all the facts before him and references to England may mean long delays. His professional success in great measure depends on economical working.

The following possible requirements are not estimated for:

(1) Printing and production of maps. No provision is required for at least 1 year. I have not the means here of making out an estimate. Eventually maps should be printed in the country.

(2) Possible extensions which are enumerated above. The question should be considered after about 1½ years work.

(3) Escort is assumed as supplied free of charge.



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I now proceed to discuss points to which my attention has been drawn by Sir Donald Stewart in his letter dated June 20th, 1905.

1. "The extent and accuracy of their triangulation".

The only triangulation as yet undertaken by the Survey department is a portion of the Rift valley a contract for which has recently been issued to Mr. Ortlepp. The terms of the contract specify what is usually called tertiary work. It is not sufficiently accurate to form a part of the secondary system proposed elsewhere as the general foundation of Survey work. It may probably however be of use when adjusted to a secondary system.

The proposals put forward by the survey department are on good principals but so far the money not having been granted the triangulation carried out is practically NIL.

2. Instruments and Methods used.

The work hitherto carried out has been theodolite survey by traverse or polygonal method with chain or steel tape. Each estate has been treated separately. This was unavoidable owing to the lack of triangulation.

Each traverse has been computed and plotted in the usual manner. With no trigonometrical points it is quite impossible to check satisfactorily the accuracy of the measurements; and from experience in South Africa and elsewhere it is quite impossible to compile a reliable map from such material. No plane tables have been used. The filling in of the interior detail would be much facilitated by their use.

The

The theodolites used have been of various patterns. Probably all are sufficiently accurate; but it is an advantage to use identical instruments. 100 feet steel bands or tapes have generally been used. This is in accordance with modern practice. The "chain" has some advantages in reducing computations, but they are more than counterbalanced by the greater accuracy of the 100 feet tape. The Drawing Office seems to be well supplied with instruments.

3. Amount and scale of Topography.

Not much topography has been done. A 1-inch map has been compiled of the Kikuyu district. The topography is not complete. It is used to show what farms have been taken up.

A 4 mile to the inch compass map of the Settima - Kenia region has been made. It is a rapid reconnaissance and is inadequate to requirements. The proposals made but not granted are good. So far the department has been much too much understaffed to undertake this class of work in a satisfactory manner. The scale should be uniform;  $\frac{1}{100,000}$  or 0.63 inch - 1 mile is a suitable scale for this country.

4. "Topographical Methods".

As above compilation from estate plans and compass surveys are the only two methods used, neither is satisfactory.

A plane table survey on a uniform scale founded on Trigonometrical points is much the most rapid and accurate method.

5. Amount and Scale of Surveyed Work.

The amount surveyed is approximately the area already granted in leases of freeholds plus current

16  
246

current work in hand for which deeds have not been completed viz: 1100 sq. miles of which four fifths is comprised in six large grants or concessions, it has never overtaken the demand. It has always been in arrears which are shown above to have rather increased than decreased. It is certain that a good deal will have to be surveyed again. The scale has varied more than necessary.

The following have been used:

Town plots	100 feet to 1 inch or	1,200
10 acre grants	400 ft to 1 inch or	4,800
up to 1000 acre grants	800 ft to 1 inch or	9,600
over 1000 acres	various multiples of the above.	

For Cadastral work two scales would suffice:

Town plots  $\frac{1}{25.3}$  or 25.3 inch to 1 mile

All estates  $\frac{1}{15,000}$  or 6.3 inch to 1 mile.

The methods of hill drawing are very variable. This has been probably unavoidable in the past owing chiefly to the employment of licensed surveyors who have each different styles.

The sheets used to show estates are of variable size. It would be worth while to have them out to uniform size for different classes of work; and headings could be printed and thus saving much time for the Draughtsman

6. "Records now kept".

Plans of estates are kept attached to their engrossed deeds  
1 deed and plan in Treasury

1 deed and plan occupier

1 copy of deed and plan Registrar

1 copy plan Land Office

It would probably be better to keep them flat and not as at present rolled up and in pigeon holes.

This would involve the use of suitable chests of drawers.

It is essential that these valuable records should be kept in a stone building. At present a fire would cause immense public and private inconvenience and expense.

The keeping of estate plans might be vastly simplified. If a general Cadastral Survey on a suitable scale had been ready and printed previous to the land settlement it would no longer have been necessary to file the plans and engrossed deeds together. The deeds would have been filed separately and conveniently in drawers. Whilst all that would have been necessary with the plans would have been to mark off on four maps the estates as they were registered.

One map would have been kept in the Survey Office for the information of the public. One by the Registrar.

*One in the same office for*  
A sufficient portion of one would have been cut out and sent to the occupier. The estates would have been numbered and the names of the occupiers entered with the same numbers of the deeds and an index kept up to date would show which plate was required for each.

In this method it is scarcely possible for the same plot to be allotted in error to two persons; a mistake which is liable to occur under existing system.

The records of application for land registration &c, are not kept in a way which makes analysis of delays very easy. I recommend that the date of each stage in the process of granting land should be entered in a separate column of a large sheet. The object of this recommendation is to increase the control of business by shewing clearly at what point delays occur.

It would then be easy to show diagrammatically the state of business by the method of curves. Thus on registration a diagram showing total time taken since application would be entered up, similar to the curve of Appendix I. There the abscissae are the dates of registration whilst the ordinates are the time elapsed. This curve would show generally whether the work is increasing faster than the staff can cope with it or vice versa.

It would be well to diagrammatise in a similar manner other stages corresponding to the columns of the records of the application. Thus one curve would show time elapsing between 1st application and the issue of instructions to survey - being the interval required for the statement of local objections, if any, by Sub-Commissioner. The next curve would show the time taken on actual survey work, being the interval between the issue of instructions to surveyer and the completion of the tracings in the draughtsman's office. The next stage would be the interval required for the preparation of the draft agreement by Crown Advocate. The next interval viz the time taken by applicant in answering is important since

since any delay here is due to the applicant and not the Land & Survey Office. The last interval is the time taken for the engrossment and execution of deeds up to final registration. With such curves continually up to date the Land Officer would be able to see at a glance if any undue delays are occurring and would have before him reliable information on which to base increases or reductions in his staff. If an extra clerk were required in his office for this purpose it would be well repaid by increased efficiency. I am informed that the usual correspondence registers, accounts, store ledgers &c, &c, are at present properly kept. It did not appear necessary for me to examine this question in detail. It chiefly concerns audit.

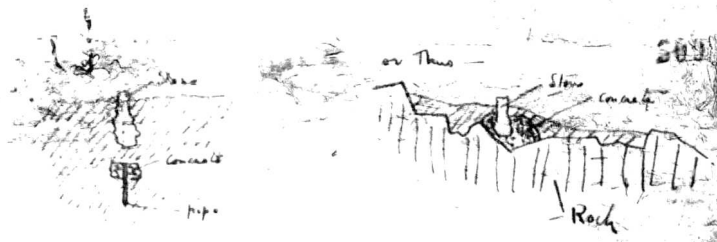
7. "Property Boundaries now marked."

Every angle of each boundary is now marked by a stone set into the ground. Each stone is about 60 lbs in weight and costs 2 Rupees.

No difficulty seems to have arisen on account of them. There should be a condition in agreements making occupiers responsible that boundary stones are kept in proper condition. In case renewal is necessary I think that it should be done by the Land Department.

I think that a short length of iron piping should be driven into the ground beneath each corner stone with a small quantity of concrete about its head. If the ground should be rocky the corner stones should be well bedded in concrete.

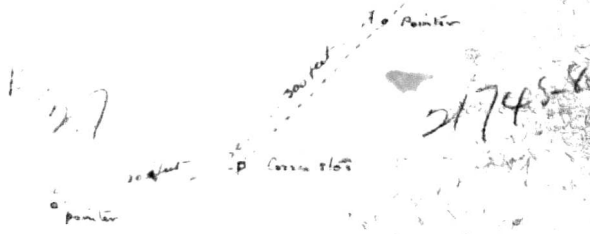
21748-8



A

In case of very large estates or where corner stones are not intervisible pointers say 300 feet from corner stones should be put in:

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21748-8

B

Power to make bench marks on buildings should be taken. The ends of building lines should be marked similarly to estate corners. Power should also be taken to clear hill tops of timber &c, and erect permanent trigonometrical Beacons as may be necessary for the trigonometrical Survey proposed.

8. "Level Lines".

So far no level lines have been run. As soon as a triangulation is available heights of boundary stones should be worked out, this would be merely a part of a general survey. There would have been no advantage in attempting any such work except

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for special purposes previous to triangulation.

9. " Draughtmen and Office work."

The present staff, appears to require some reorganisation and strengthening. At present there are two vacancies. I consider that the English draughtmen should be increased whilst the Indian draughtmen can be reduced. I expect greater efficiency to result from this change. The details are shown in Appendix IV. showing proposed alterations in existing staff. It will be seen below under a heading below that I recommend an increase of one draughtman for the compilation of earlier surveys, and the constant correction of existing maps as information is acquired. It will be more convenient, with practice to change the official title of the head of this branch from " Plan examiner " to " Chief Draughtman ".

Neither the drawing office nor the general office is large enough. It will be <sup>much</sup> the best plan to build adequate stone offices. I understand that money has been granted for an increase of accommodation in wood hutsments and that the work should shortly commence. This however is not adequate, stone buildings are essential. The loss to the public in the event of fire, which is much more likely to happen in a wood and iron building, might be very large. The accommodation for the public should be much improved. There should be a counter on which plans &c, could be laid for inspection and facilities for the public to write.

It is inconvenient at present for the Land Officer not to have a room to himself. Interviews

must



must delay other officers working in the same room, and he should certainly be able to have a confidential interview without clearing his office. In building offices facilities for extension should not be forgotten nor the possibility that the Land Office and Survey may be separated.

#### The Superior Staff.

The qualifications of these gentlemen appear to be satisfactory.

The Land Officer and Chief Surveyor, Mr Barton Wright in particular has a very good experience of greater triangulation work in Perak. Both he and Mr. Waring, the Assistant Land Officer and Chief Surveyor, have fully realized the inadequacy of present organisation and have recommended many times measures for their improvements.

In the event of a separation between the Land and Survey Department, two alternatives would have to be considered, either Mr. Barton Wright would retain the position of Land Officer, remaining the head of that department, or a gentleman might be sought with longer experience of Land in some Colony. Mr. Barton Wright had no experience of Land Office work previous to his present appointment. I consider that it would be a great pity to waste the experience he has now acquired. I however recommend that this officer should be sent (if he retains his appointment) on a six months tour to examine personally into the practices

practices of other countries say Canada, Australia, New Zealand and the United States.

I notice in the agreements of the Assistant Surveyors that these gentlemen are entitled only to second class passages. I consider that their status in life is at least as good as that of a Sub-Collector, whilst they have superior Technical qualifications. I recommend that 1st class passages should be allowed. I find that such 1st class passage has in fact been allowed to Mr. Townsend who is now on his way out.

I notice that Government engages to provide quarters in para 6 of their agreements. I understand that quarters are not always available. I consider that allowance in lieu of quarters should be granted which might be equal to travelling allowance, at the same rate as that of a Sub-Collector, and be drawn by them in lieu of quarters when such are not available. I understand that the Crown Advocate agrees with me that the Government are legally bound to make such an allowance.

I notice that the system of drawing travelling allowance is open to objection. The claims have to be supported by elaborate vouchers. It appears to me to be contrary to the public interest to require these vexatious returns, which take up the time of the officers, which is too valuable to waste. I recommend that a certificate by the officer concerned that he has been travelling away from Head Quarters, countersigned by the head of the department, should be

be sufficient and complete. In the case of the allowance which I recommend payable in lieu of quarters, the signature of the officer responsible for their allotment should also be required. What does it matter to H.M. Government whether the correct amount of jam, sardines &c., &c., has been expended or whether the individual prefers to economize? Every Official should keep a diary which would be a very complete check for occasional audit. There is ample power for punishment should fraudulent returns be rendered.

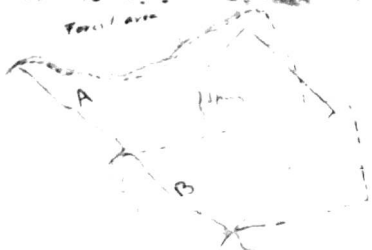
Measures should be arranged regarding the re-engagement of Assistant Surveyors on completion of their 3 years term of engagement. It must be remembered that a man who has spent some time in the country has, by his experience of native language, customs, transport &c., become of greater use and becomes able to get through more work in consequence. He probably requires greater inducement to remain than the chances of promotion in the office allow.

I suggest on second engagement a rise of £50 i.e. from £250 to £300 in salary and a further annual rise of £10 to £350 whilst I consider that his whole service should count for pension under rules similar to that of the Civil Staff of the Protectorate I consider that 10 per cent increase of salary should be allowed for those who work continuously in the unhealthy parts of the country, say within 40 miles of the coast or of the Lake Victoria, periods over 1 month to count. In other respects the conditions of service should be assimilated to the Civil Staff

and

and after the first 3 years become permanent. There is at present a death vacancy among the Assistant Surveyors, this I understand is being filled at an increased salary. An increase of two or three -- Assistant Surveyors is most desirable. Such an increase is required to cope with the present estate work.

The use of licensed surveyors as at present is open to serious objection. The accuracy of their work cannot be checked and since payment is by results there is a great inducement to dishonest and scamped work, which cannot at present be detected. After triangulation this objection would to a great extent vanish. Unless and until it becomes the usual practice to survey previous to selection there remains the further objection that it is in the power of the licensed surveyor to exercise favouritism in the -- survey and marking of estate boundaries. Since possibilities of corrupt practices are involved I } develop my point by two possible illustrations.



21/8/11

Suppose Mr A and Mr B are allotted river frontages as shown. If Mr B's property is first surveyed as shown in continous line Mr B gets a useful spring in the middle

C. K. Jones

delay is caused owing to each agreement being drawn separately, and in copying. It may be necessary to deal specially with large estates and special cases, but much time would be saved if ordinary deeds are reduced to identical forms. I recommend that the Crown Advocate's office should be strengthened by a branch at Nairobi chiefly employed on land work and in close touch with the Land Officer. It should have offices in the same block of buildings.

I infer from delays which have occurred in the past that the strengthening recommended is required. I have consulted the Crown Advocate on this subject and find that he agrees with me.

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304

Previous Survey.  
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The best use of existing sources of information has not been made. Indeed whilst "Survey" is in practice a branch of the "Land Office" and the press of work is very great such work could not be expected. In fact such work has only been undertaken in the past in a more or less desultory manner by the following authorities, none of them having <sup>by</sup> any means complete information, and often undertaken for special purposes only:—

The Intelligence Division War Office, as part of the general work producing a map of Africa on the 1,000,000 scale from Railway preliminary survey, boundary surveys &c.

The Royal Geographical Society for illustrating of papers read and general geographical information.

Lieutenant-Colonel Smith, - compilation of previous information to assist special purposes of his journey along the Anglo-German boundary.

The East Africa Syndicate, - some survey in connection with Magadi or Soda Lake and proposed railway.

His Majesty's Commissioner, - Sir Donald Stewart has I believe entered new names and places in maps in his office.

Officer Commanding Troops, - Has attempted such work from military reconnaissance.

Mr. R. ddis has done some 3 inch Theodolite triangulation in extension of the '92 boundary commission.

It is evident that it would be for the general good if such compilations were undertaken by one central authority; and equally evident that the Survey Department in this Protectorate should undertake it.

I think the work of compilation is likely to increase rather than decrease in the future. A beginning should be made by the addition of a good European draughtsman for this special purpose only. He should have been employed on such work previously if possible and be used to working on a small scale. His work would be to keep up to date

- (1) A general sheet  $\frac{1}{1000,000}$  scale
- (2) other sheets  $\frac{1}{1000,000}$  and a tracing of each.

The following sources of information should be utilized:

(1) The present Anglo-German Boundary Survey; The co-ordinates have already been communicated, the tracings will be communicated before leaving the country. Maximum error probably about 100 feet.

(2) Admiralty Charts. Astronomical errors would be very small. There would remain errors owing to the differences between Astronomical and geodetic positions.

(3) The Anglo-German Boundary Survey of 1892 published by the Intelligence Division War Office in four sheets. Maximum error co-ordinates about 600

who should be consulted on the subject and whose journal should be regularly taken in.

(12) Miscellaneous Reconnaissances of Officers of the Protectorate and K.A.R. such as Mr Wobley, Mr Ainsworth, Lieutenant Jeverson Power &c., &c., All such should be communicated to the Survey Department.

(13) When Government or licensed surveyors work on outlying country they should be required to produce rapid reconnaissance notes to the surveys connecting outlying estates with known points. From these miscellaneous materials a very much improved map could be kept up to date. It should be reproduced as required on demand by other departments. For this purpose some prints from the tracing of the kind which produce a dark blue line on a white background would be the simplest method of reproduction, as a large number of prints is not contemplated. It is necessary for this purpose to draw the map in a suitable manner for such reproduction with rather a coarse form of map drawing horizontal approximate form lines being used for hill features. From time to time these maps should be traced and photozincographed for publication; perhaps once in three years would be sufficient.

Land Settlement.

It is very necessary that the general lines of Land settlement should be laid down and greater power be delegated to the Land Officer.

The general principle which I consider should be adopted is as follows:

In townships <sup>the plots</sup> must of course be small say 40 x 100 feet.

In



In suburbs 2 acres.

Within the 1 mile zone from the Railway ( which should be laid down on the map by an approximate system of polygons and no attempt made to draw parallel curves, which would always be very expensive to lay out on the ground ) blocks of 100 acres or regular multiples or sub multiples thereof. Within 10 miles of Railway or town centres medium sized estates say up to 640 acres.

More than 10 miles from the railway, back Blocks normal size 5000 acres.

Certain districts away from the railway might also be retained for medium homesteads; but such should be defined.

If the general lines are laid down on general principles, only estates of over 5000 acres need be referred to the Commissioner. In the case of applications smaller than that proper to the zone  $\frac{1}{2}$ ,  $\frac{1}{4}$ , or  $\frac{1}{8}$  blocks should be allowed subject to fair distribution of water facilities, but not miscellaneous numbers of acres.

Although contrary to the practice of many Colonies it appears to be the opinion of the Land Committee that lease holds and freeholds should be open to the freest transfer. But of course registration of transfer is essential.

209

### Survey Fees and Rules.

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The survey fees are calculated according to perimeter of an estate of average shape at Rs: 45 per mile. A comparison with the fees charged in the Transvaal and the Australian Colonies shows that some are greater whilst others are less. They appear to be reasonable.

Extra charges for surveys away from the railway might with advantage be more definitely specified.

Extra charges at so much per mile along the perimeter of an estate, which should be shown on estate plan, in forest or thick bush should be made. I consider a rate of Rs: 30 per mile would be about right, but it would be well to accumulate some further data as to expenses incurred before deciding finally. Increased time of Surveyor and cost of labour in cutting are the two causes of increased expense.

### Transport.

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At present the transport is not charged against the Survey Department. The Survey votes consequently do not give a complete account of the cost. It is not possible to lay down exactly the numbers required. These will always be variable. The greater the distance from the railway the more men are required. Extra men are often required for clearing

clearing forest from hill tops or along the lines of an estate. It makes a very great difference whether food for porters can be obtained on the spot or whether it may have to be carried long distances. In the latter case stores at depots may have to be built. Nor is it economical to cut it down to a minimum owing to various circumstances. A good many instruments, books, plates &c are only occasionally wanted, but great delay may occur if they are not all carried. This is much more the case with trigonometrical operations than with estate or cadastral surveys where the methods used are always the same. Officers must carry clothing &c., to suit varied climates. Frequently a change of climate due to a change of as little as 8000 feet in altitude is not within a day or two.

It is much more economical to compute in the field, because the officer can frequently be computing whilst awaiting for fine weather or timber clearing &c. Also it is a matter of experience that one gets through much more work in camp in the wilds, where the only recreation is occasional shooting, than can be done at Head Quarters such as Nairobi. The normal office hours at Nairobi are six; I doubt if they can be increased with advantage. They certainly should not be larger in one office than in another. If the bulk of the work is done in the field liberal allowances of tents and tables &c., are required, and where the camp is likely to last some time grass huts are advisable for improving comfort

and

and facility of work. Improved comfort means good health, which in turn works for economy. The erection of Trig stations, clearing of hill tops near them when forested, and cutting paths through thick forests all involve much labour. It is of very great importance to so adjust the labour and transport as to avoid any delay on that account. The officer in charge of survey must have a very free hand with his transport, whilst sound finance requires that the charge should be debited to Survey Vote.

#### Land marks and Boundary Surveys,

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It would in my opinion be worth while to mark with a length of iron pipe driven into the ground and a pile of stones the sites of such main stations of the Boundary Survey as are in English territories. This was not done by me as it was not necessary to my work and would have caused expense and delay. It could be done without difficulty by Lieutenant Leveson (now captain) of the N.C.Os of the Commission. It would take about 1 1/2 days labour at each of 34 stations and 74 days marching between them total 125 days.

The following should be marked:

Camp Beacon Laitokitok, -lgaria, Losotto, Engero  
Lomomo, Maduyati, Wi, Enoitij, El Meshanai, --

If unfortunately any point cannot be identified exactly it would be better not to mark it at all than to do so inaccurately.

Escort.

It is presumed that escort would be supplied from the K.A.R. or police; I do not think it matters to the survey which is selected.

It is assumed that their pay would not be charged against survey. Each separate party requires a guard, even where no natives are found, there should always be a night guard on account of lions etc. Sometimes a guard would have to be left at stores. If the guards are calculated at 3 reliefs and 1 N.C.O. and two spare guards the numbers required would be  $(17 + 2) \times 10 = 190$  rank & file. This allows for each officer and each topographical N.C.O. to work independently, which is much the quickest method of working in working through a hostile country, a less satisfactory method involving parties being kept more together would have to be adopted and some increase of escort would be necessary.

Wainwright 31<sup>st</sup> July 05

Wainwright  
10/11

## APPENDIX I. continued

M.M.de Souza	6-10-03	8-8-04	10
J.T.Duffy	8-8-03	9-8-04	12
R.C.Mission	11-11-03	12-8-04	9
W.P.Duman	30-9-03	18-8-04	11
L.J.Tarlton	5-3-04	27-8-04	6
Peacock boob	3-8-03	do	12
C.N.Harrison	17-9-03	do	10
V.M.Newland	16-4-04	19-9-04	6
A.D.Impay	do	21-9-04	6
J.T.Oulton	12-10-03	23-9-04	10
Robert Thompson	6-1-04	27-9-04	9
H.D.Cooper	28-12-03	3-10-04	10
do	do	9-10-04	10
H.V.Harris	28-12-03	18-10-04	10
J.R.Creighton	3-04	12-11-04	8
A.Rangel	25-1-04	20-11-04	10
J.M.Compass	do	22-10-04	10
R.Knowles	23-1-04	24-11-04	10
H.A.Quin	20-11-03	26-11-04	12
J.R.Wood	1-4-03	1-12-04	8
do	do	do	8
Major P.Henney	11-1-04	16-12-04	11
a.Almeida	18-1-04	12-12-04	11
J.deQuisen	6-8-03	-	16
D.Ordini	12-8-03	19-12-04	16
John Scott	1-1-03	"	24
Wm.Macallister	25-3-03	20-12-04	21
J.Paterson	8-9-03	22-12-04	15
do	do	do	15
A.T.Mabent	14-9-03	29-12-04	15
J.T.Uffman	27-8-03	"	16
D.O.Roberts	25-3-04	7-1-05	10

APPENDIX II.

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I now propose to analyse the cost of the boundary Survey and to make it the basis of an approximate estimate of the cost of the secondary, Tertiary and topographical Survey contemplated. I also use it as a means of checking the estimates sent in by the Survey and Land Office. In order to compare fairly the figures I find that the cost of the boundary Survey was 30 % more than it would have been if I had not been operating far from the railway. Also owing to transport and other delays which would probably not have occurred near the railway. 30 % must be added to the output.

The whole time of one officer was required for erecting Boundary pillars, I consider that this officer would have been able to carry out tertiary triangulation over the area covered by the sketchers had it been required.

The figures are as follows for 1 years work.

Table 1.





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