Public Works (1896) Department.

G.O., No. 490 P

Dated 10-6-96

[Despatch Abstract.]

Lt. Col: A. W. Swart. Rlo. Supty: Engrs: Despatch from the Right Honorable the Secretary of State forwarding a copy of Correspondence with — when he was deputed to inspect certain French canals and rivers and to select 2 current meters for use on the Godavari delta Irrigation works, and stating that the purchase and despatch of the meters selected will be arranged by the Director General of Stores, Comm[illegible] to the Chief Engineer for Irrigation and the Examiner of P.W. Accounts.

[P.W. 20
1,000 - 25-10-96.]

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

No. 490 I., 10TH JUNE 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

Despatch from the Right Honourable Lord GEORGE HAMILTON, Her Majesty's Secretary of State for India, to His Excellency the Governor in Council, Fort St. George, dated India Office, London, 19th September 1895, No. 4, Public Works.

On the receipt of your Excellency's Public Works letter, No. 10, dated 17th December 1894, Lieutenant-Colonel A. W. Smart, R.E., was placed on duty, as desired by your Government, to inspect certain French canals and rivers and to select two current meters for use on the Gódávari Delta irrigation works.

Letter to Col. Smart, dated 11th Jan. 1895.
Letter from Col. Smart, dated 30th April 1895.
Letter to Col. Smart, dated 3rd May 1895.
Letter from Col. Smart, dated 6th May 1895.
Letter to Col. Smart, dated 15th May 1895.
Letter from Col. Smart, undated (enclosures in original).
Letter from Col. Smart, dated 30th Aug. 1895.
Letter to Messrs. Cox & Co., dated 3rd Sept. 1895.

2. I now forward a copy of correspondence with Lieutenant-Colonel Smart, from which you will learn the terms granted to him and the time which he occupied in carrying out the duty assigned to him. I also transmit the notes and plans which he has submitted.

3. The purchase and despatch of the two current meters required by your Government and selected by Lieutenant-Colonel Smart will be arranged by the Director-General of Stores of this office, and a further communication conveying the information asked for in the second paragraph of your letter will be addressed to you later.

ENCLOSURES.

From C. S. COLVIN, Esq., Secretary, Public Works Department, to Lieut.-Col. A. W. SMART, R.E., Cambridge Terrace, Hyde Park, dated India Office, 11th January 1895, P.W. No. 40.

A despatch has recently been received at this office from the Government of Madras proposing that you shall be placed on duty during a portion of your furlough for the purpose of selecting two current meters for the Gódávari delta works, and also with the view of your inspecting a limited number of French canals and rivers.

It would be convenient if you would arrange to discuss this proposal personally with this department before further steps are taken to obtain the sanction of the Secretary of State in Council to it, and I have accordingly to suggest that you should call at this office on any day that may be convenient to you between the hours of 11 and 4, or, if on Saturday, before 2 o'clock.

From Lieut.-Colonel A. W. SMART, R.E., to the Under Secretary of State for India, dated Hazeldene, Molyneux Park, Tunbridge Wells, 30th April 1895.

With reference to your P.W. No. 40, dated 11th January 1895, I have the honour to state that I have been able to get no certain information with regard to the Pilot's tubes which I have been commissioned to purchase for the Madras Government. I was recommended by Major Tulloch, of the Government Board, to pay a visit to Paris for the purpose of making

inquiries, and I request that I may be allowed to do this with your sanction and at the expense of the Government. I would request that I may at the same time be allowed to visit the St. Denis Canal in which valves are in use of which drawings are required. If these proposals meet with your approval, I would require letters of introduction to the heads of the Ponts et Chaussé in Paris requesting them to give me the necessary information as to the purchase of the Pilot's tubes and also for authority to visit the St. Denis Canal and to see the valves put in use.*

From C. S. COLVIN, Esq., Secretary, Public Works Department, to Lieut.-Col. A. W. SMART, R.E., Hazeldene, Molyneux Park, Tunbridge Wells, dated India Office, 3rd May 1895, P.W. No. 756.

I am directed to acknowledge receipt of your letter of the 30th ultimo requesting that you may be allowed to visit Paris at the expense of the Government for the purpose of making inquiries relative to the purchase of the current meters required by the Madras Government, and also that you may be permitted to visit the St. Denis Canal.

In reply I am to request that you will state what time will be occupied in the inquiries you propose to make.

From Lieut.-Colonel A. W. SMART, R.E., to the Under Secretary of State for India, dated Tunbridge Wells, 6th May.

With reference to your P.W. No. 756, dated 3rd May 1895, I have the honour to state that the time required for purchasing the Pilot's tubes and for inspecting the St. Denis Canal will be from ten to fifteen days probably, that is, if there is no delay on the part of the French engineers. It will be necessary to test the tubes in all probability in the Seine, as it will not do to purchase them without such test.

From REAY, Esq., to Lieut.-Colonel A. W. SMART, R.E., Hazeldene, Moylneux Park, Tunbridge Wells, dated India Office, 15th May 1895, P.W. No. 794.

With reference to your letters of the 30th April and 6th May, I am directed to inform you that the Secretary of State for India sanctions your deputation to Paris on duty with the view of arranging for the purchase of the two current meters required by the Government of Madras and also of visiting the St. Denis Canal.

The purchase of the current meters should be effected in communication with the Director-General of Stores of this office, and you are requested to forward a copy of your notes of inspection to this office for transmission to the Government of Madras.

During the period of your tour, not exceeding fifteen days, you will be allowed two-thirds of your Indian pay and allowances, together with £1-1-0 a day to cover travelling and subsistence expenses.

The Foreign office has been requested to furnish the necessary introductions to enable you to obtain the information you require.

From Lieut.-Colonel A. W. SMART, R.E., to the Under Secretary of State for India.

With reference to your P.W. No 900, dated 8th June 1895, I have the honour to forward diary and notes of my visit to Paris for the purchase of Pilot's tubes. My visit extended from 10th June to 25th June inclusive, or thirteen days in all. The manufacturer of the tubes, Demichel, 24, Rue Pavea au Marcus, Paris, had none of the tubes on hand, but I gave him orders to put a set in hand and to forward them when ready to you for transmission to Madras.

I enclose plans of the lock valves in use on the St. Denis Canal, as also two pamphlets, from which the descriptive part of my notes has been taken—one, Le Barraye de Luresnes; the other, note sur les nouvelles ecluses du canal, St. Denis.

From Lieut.-Colonel A. W. SMART, R.E., to the Under Secretary of State for India, dated 30th August 1895.

With reference to your P.W. No. 1468, dated 29th August 1895, I have the honour to state that my pay when I left India was Rs. 1,422 per month.

* Your letter has remained unanswered as I have been seriously ill and have only just recovered.

From C. S. COLVIN, Esq., Secretary, Public Works Department, to Messrs. COX and Co., 16, Charing Cross, S.W., dated India Office, 3rd September 1895, No. P.W. 1505.

In reply to your letter of the 23rd ultimo, I am directed to inform you that, in calculating the special duty pay due to Lieutenant-Colonel A. W. Smart, R.E., for the thirteen days from the 13th to the 25th June last, in accordance with this office letter of the 20th ultimo, that officer's Indian pay should be taken as at the rate of Rs. 1,422 per month.

ORDER—No. 490 I., dated 10th June 1896.

Communicated to the Chief Engineer for Irrigation, and also to the Examiner of Public Works Accounts, with reference to paragraph 2 of G.O. No. 1314 W., dated 27th April 1896.

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Colonel, R.E.,
Secretary to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ the Chief Engineer, Buildings, Roads and General Branch.
„ all Superintending Engineers.
„ Lieut.-Col. A. W. Smart, R.E., Superintending Engineer, on special duty, Cauvery Completion Estimate, Tanjore.
„ the Examiner, Public Works Accounts.

Exd. S. J. Pereira.
Spare Copies

IRRIGATION.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated June, 10th.

Recd. *Encl.*

G.O. No. 490 I., 10th June 1896.

JUNE.

Lieut.-Col. A. W. Smart, R.E., Superintending Engineer

Despatch from the Right Honourable the Secretary of State forwarding a copy of correspondence with — when he was deputed to inspect certain French canals and rivers and to select two current meters for use on the Gódávari Delta irrigation works, and stating that the purchase and despatch of the meters selected will be arranged by the Director-General of Stores, communicated to the Chief Engineer for Irrigation and the Examiner of Public Works Accounts.

No 490 I. dt 10 June 1896.

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

Despatch from the Right Honble the Secretary of State for India. (Pamphlet sent with the despatch.)

(G.O. No. 4 - Public Works dated 19 Sept. 1895.)

D.S.K. 30.5.96

Communicated to the Chief Engineer for Irrigation, and also to the Examiner of Public Works Accounts with reference to para 2 of G.O. No. 1314-W dated 27 April 1896.

8/6

Encls 25/5/96

To
The Chief Engineer for Irrigation with
" Chief Engrs., Buildings, Roads & General branch.
All Supdg. Engineers.
Lt. Col. A.W. Smart R.E., Supdg. Engr.
on special duty, Cauvery Completion
Estimate, Tanjore.
The Examiner of Public Works Accts.

17/5 BSR

P.M.
1331
1895

Lt Col Smart's deputation, in June 1895, to inspect certain Canals in France and to collect current meters for use in the Presidency

Issued
Rec'd

E. I. Form No. 1—500—14-5-95

O.S. 123

Oct 951 — send make/ copy

Thursday. 13th/ June arrived in Paris in the evening

Friday. Presented letter of introduction at the embassy. Invited to return next day for instructions.

Saturday. Interview at the embassy with one of the assistants. Letter of introduction to Minister of Public Works promised.

Sunday. Rec'd. letter and went to ministry. Interview with Chef du Bureau who promised a letter to the engineer. In the meantime he recommended me to call on M. Klein Principal Storekeeper of the Port & Channels Department as to him. Asked by him to meet him next morning at the Tuileries.

Tuesday. With M. Klein at the entrance to the Tuileries; inspected Pitots tubes which were however not very complete. Received end of introduction to M. Kiltter the inventor of modifications of tubes.

Wednesday. With M. Kiltter & then on to manufactory of instrument.

Thursday. Again to the makers and then on to Canal St. Denis. Saw the engineer who asked me to come next day to visit with him the Canal St. Denis where M. Fontaine's valves are in use.

Friday. With M. de Bois on St. Denis Canal.

Saturday. With M. Kiltter at Tuileries - making experiment in small channel of running water with Pitots tubes. M. Kiltter kindly explained method of using the instrument &c.

Monday 24th. Journey from Paris to London.

Tuesday - 25 Returned to London.

13 days including 2 Sundays.

Ambard
Engr

1331
1895

New Lock. St. Denis Canal

The total length of the canal is 6,647m20 from the Villette basin to the junction with the Seine. The total fall is 28m34. Before the construction of the new locks this fall was overcome by twelve locks; four double locks and four single. The falls varied from 2m30 to 2m50. The widths were 7m50 between the quoins, with a utilisable length of 42m. The normal depth of water was 2 metres.

The deepening of the Seine to a depth of 3m20 necessitated the remodelling of the canal. The falls for all the new locks are the same as for the old with the exception of the first four which have been replaced by locks of a single fall of 9m92. The general type is two locks side by side for each fall. Large locks 8m20 width, 62m50 length; small locks 5m20 width, 38m50 length, adapted to the size of the boats in use. The locks are separated by a central wall in which are placed the sluices for emptying and filling. The gates are single framed to the same wall and worked mechanically.

The only lock inspected by me with the engineer in charge M. duBois was the large one of 9m92 with a fall of 9m92. It was decided that in order to allow of a single lock being constructed the following difficulties had to be overcome

1) The lower gate, if the lock was to be built in the usual way, would have been 15 metres in height.
2) The leakage would have to be very considerable.
3) The tonnage capacity of the canal would have been reduced as the boats would have required a longer time to pass through.

The clearway for over bridges is 5m25. With regard to the lower gate then the top of its movable part need not be more than 5m25 above the surface of the water in the lower reach. It was permissible then to have a fixed upper part either a mask of masonry or a metallic structure. In the present case the upper part is of masonry forming part of the bridge which is required to allow of the passage of horses &c to the towing side. The gate when closed thus abuts on four points on the sides and is in a single piece worked by machinery as in all the other cases.

The canal is fed from above. The old lock above had a fall of 4m50. It was necessary therefore to limit the consumption of water to that required for the old

locks and this could only be done by some method of economising
lockage. For this two side reservoirs were built between two
Two locks, one for each lock, by means of which $\frac{1}{3}$ of the
lockage was economised. The locks communicated by openings
closed by light sliding shutters, taking pressure on either
side, with these reservoirs. The reservoirs could be thus
filled when two locks were about to be emptied or emptied
back into the locks when two locks were about to be filled.
To meet the third difficulty the orifices for filling and
emptying were calculated so as to allow two locks being
filled or emptied at the same time as two descending
locks in the canal. It has been found that boats may
be lowered or raised at the rate of $0^m.025$ to $0^m.03$ metre
a second without any fear of danger. (see the planche
in Note sur les nouvelles Ecluses St. Denis 1892)

The valves are of the ring cylindrical type of which there
are furnished herewith of $1^m.60$ diam ~~Respass~~ ~~Stuart~~
and are the invention of M. Fontaine and were first used
some 7 or 8 years ago on the canal du Centre. I saw
them worked at St. Denis and I have certainly seen
no valves whether in England or India which can
be compared to them in facility of working and they
are said to require very few repairs. Originally the
heavier parts were of cast iron with a dome above also
cast iron but it has been found that steel is much
better stronger and more easy to transport and instead
of having a dome a steel tube is taken up to above
water level. One man works the valve without
the slightest difficulty. (see plans)

I would recommend the purchase of a set complete
in Paris for use at any convenient lock where valves
may be required in the Sudan or Kistna. There
would be no difficulty afterwards in making them
up in the Indian workshops. They should be
purchased complete with the rack & pinion by which
are erected in a small circular box and pedestal,
forming one piece, made to screw down into the platform.

P.W.
1331
1895

1331
1895

The dams of Suresnes, 16 kilometres below Paris, was constructed in 1880–1884 to take the place of the work constructed in 1867. The object with which the new work was undertaken was to raise the level of the Paris reach by 1 metre and to increase the capacity of the locks. The works consist of three locks and three moveable dams separated by two islands; of houses for the sluice men and other accessory works.

Locks. The large lock on the left bank is 199m50 in length and 12m wide between the side walls holding the gates, and 16m50 deep; the navigable ~~length is 180m50~~, the minimum depth of water is 4m. The second lock is 99m in length, and 12m wide, with a minimum depth of water of 4m. The third lock is the old one somewhat modified, but with a depth of water of 2m20. The gates of wrought iron of the old lock have been kept and raised; the gates of the new locks are made of frames of oak, with cross beams and planking of pitchpine, and strengthened by iron rods.

Dams. The three dams are constructed on the principle invented in 1834 by M. Poirée. In the central pass the moveable part of the dam consists of small shutters placed one above the other and sliding against the upright corbels of the hinged frames. The shutters are 1m22 in width and 1m10 in height and their thickness 0m04 for the upper row, 0m06 for the second row, and 0m07, 0m08 for the following rows.

In the pass on the right bank the shutters are ~~bolted~~ curtains made of ~~planks~~ narrow planks so hinged that they can be rolled up by an endless ~~differential~~ chain.

On the left bank the spaces between the frames are closed alternately by five small shutters and by the hinged curtain shutters

When rolled up the curtains necessarily open from below and cause violent horizontal currents on the down stream. The shutters, on the contrary, allow the water to discharge superficially from above, as they are removed one by one. The pressure of water against the shutter which is in process of being lifted is therefore always small and the sheet of water is broken by the fall onto the lower apron. The normal overfall is 3m27.

The lengths of the left pass when open is 72m3 with 57 frames of 6m.01 height
do centre . . 62m88 " 49 " of 4m21 height
. . . right . . . 62m38 with 49 " of 5m29 height

The frames 6m.01 weight about 1500 kilogr; those of 5m.49 1350 kilogr and those of 4m21, 800 kilogr. They are lowered or raised by means of a continuous chain, worked by a winch placed on the bank. The length of the chain between the points where the chain is attached to the frames being greater than the distance apart of three, five or six frames are lent in curtain at the same time when the chain is worked, and when the first frame reaches the vertical, the six or seventh is still lying on the floor, onto the intermediates ones more or less inclined. In this way it is only necessary to unroll a metre or a metre and a half of chain to bring each frame to the vertical and the duration of the operation entirely depends on the time required to adjust the different members of the ... on the top of the frames; this time is 3 to 4 minutes at the most or 3 to 4 hours for each pass.

The cost of the works was as follows -

For the left pass 12,276 francs per running metre
. . centre . 7,727 . . . . .
. . right . 10,817 . . . . .

or an average for the whole dam of 10,375 francs per Rg metre. Including all the accessory works such as protection of banks, houses for workmen, stores &c the Senegues dam cost 2,800,000 francs for 197m14 of opening or 14,200 francs per Rg metre or 3,125 francs per square metre of vertical surface of shutters

CHIEF ENGINEER
FOR IRRIGATION.
14 MAY 96
No. 9559

I. T.
1331
1895

P.W. Ewl 8/69/95

No 9

Copy Correspondence
with Lt. Col. Smart

CHIEF ENGINEER
FOR IRRIGATION.
14 MAY 96
No. 954

Referred to in Madras
Public Works Despatch
No 4 dy 19th Sept: 1895
— para 2

No 273

Office of the Superintending Engr
Cauvery Completion Estimate
Jaypore dated 12th May 96.

From.

Lt Col A.W. Smart RE
Superintending Engineer
on Special duty

To. The Chief Engineer for Irrigation
Madras.

Sir,

With reference to your letter no. U/93-5A
Encls 16. (6 sent separately). dated 5th May 1896, I have the honor to return herewith the Secretary of State's despatch No 4 P.W. dated 19th September 1895 with 16 enclosures, and to inform that there is no letter from the Secretary of State bearing No 4 P.W. dated 19th April 1895, as stated in your above Memo.

I have the honor Sir,
Your most obed. Servt
Arthur Lt Col RE
Superintending Engineer
on Spl. duty

CHIEF ENGINEER
FOR IRRIGATION.
14 MAY. 96
No. 95 I.A.

From

Lt Col A.W. Smart R.E.
Superintending Engr
on Spl duty

To The Chief Engineer for
Irigation
Madras

No 273
Dated 12th
Recd 12th } May 1896

Subject

Subject:- Returning Secretary of State's despatch No 4 P.W. dated 19th September 95, with the connected papers, regarding the particulars of inspection of Estamicanaco and rivers, in France by Lt Col Smart R.E.

O.S. 123

8169

In order that Lt. Col. Smart's notes may be printed with the despatch, and communicated to all Supdg Engrs for information.

The roll of pamphlet & plans will be forwarded to E.I.

Ch
24/5/96
Lent in the Irrigation Br.
J. Branch
24/10

Read

You will see that W wishes this paper to be disposed of in I Branch - will you please take it over

Ch
24/5/96

Receipts
No. 59. 8th Jan. 96.

C/Brs

Secy. of State's despatch forwarding Col. Swaine's report of the result of his deputation to France, Chile on furlough in England, to inspect some of the French Canals and to select some instruments for the Inspection staff is lying over in your office awaiting Col. Swaine's return. He has returned & is now with the D.E.I. Please send up the file when as soon as possible.

B.R.
Ward
14/12/95

E.I.
14/12/95

Papers herewith.
D.P.
14-12-95.

D. E. I
12.95

951.

INDIA OFFICE.

LONDON, 19th SEPTEMBER 1895.

Public Works.

No. 4.

TO HIS EXCELLENCY THE RIGHT HONOURABLE THE GOVERNOR IN COUNCIL, FORT ST. GEORGE.

My Lord,

On the receipt of Your Excellency's Public Works Letter No. 10 dated 17th December 1894, Lt. Col. A.W. Smart, R.E. was placed on duty, as desired by your Government, to inspect certain French canals and rivers and to select two current meters for use on the Godavari Delta Irrigation works.

2. I now forward a copy of correspondence with Lt. Col. Smart, from which you will learn the terms granted to him and the time which he occupied in carrying out the duty assigned to him. I also transmit the notes and plans which he has submitted.

3. The purchase and despatch of the two current meters required by your Government and selected by Lt. Col. Smart will be arranged by the Director General

Letter to Col. Smart d/- 11th January 1895.
Letter from Col. Smart d/- 30th April 1895.
Letter to Col. Smart d/- 3rd May 1895.
Letter from Col Smart d/- 6th May 1895.
Letter to Col. Smart d/- 15th May 1895.
Letter from Col. Smart undated (enclosures in original)
Letter from Col. Smart d/- 30th August 1895.
Letter to Messrs. Cox & Co. d/- 3rd September 1895.

Keep with
No. 59-SA dt. 3.96

General of Stores of this Office, and a further communication conveying the information asked for in the 2nd para. of your letter will be addressed to you later.

I have, &c.,

(Sd) George Hamilton.

I.S.C.
P.W. 8169/95

No 2

Public Works.
19th September 1895.

Copy letter from Foreign Office
No 4.

INDIA OFFICE
FOREIGN DEPARTMENT
14 MAY. 95
No. 95 Sal 6 Pta
12

4807

P.W. 40.

380

India Office,
11th January 1895.

Sir,

A Despatch has recently been received at this Office from the Government of Madras proposing that you shall be placed on duty during a portion of your furlough for the purpose of selecting 2 current-meters for the Godaveri Delta Works, and also with the view of your inspecting a limited number of French Canals and rivers.

It would be convenient if you would arrange to discuss this proposal personally with this Department, before further steps are taken to obtain the sanction of the Secretary of State in Council to it, and I have accordingly to suggest that you should call at this Office on any day that may be convenient to you between the hours of 11 and 4, or if on Saturday before 2 o'clock.

I am, etc.,

(Sd) Clement S. Colvin.

Secretary

Public Works Department.

Lieut. Col. A.W. Smart, R.E.,
6 Cambridge Terrace,
Hyde Park.

P.W. Eng 8189/95

CHIEF ENGINEER FOR IRRIGATION. 14 MAY. 95

No. 9 Sa.

Hazeldene,

Molyneux Park,

Tunbridge Wells,

Your No.40 P.W.

30th April 1895.

Sir,

With reference to your P.W. 40 dated 11th January 1895 I have the honour to state that I have been able to get no certain information with regard to the Pitot's tubes which I have been commissioned to purchase for the Madras Government. I was recommended by Major Tulloch of the Government Board to pay a visit to Paris for the purpose of making enquiries and I request that I may be allowed to do this with your sanction and at the expense of the Government. I would requ[illegible] that I may at the same time be allowed to visit the S[illegible]is canal in which valves are in use of which drawings are required. If these proposals meet with your approval I would require letters of introduction to the heads of the Ponts et Chaussées in Paris requesting them to give me the necessary information as to the purchase of the Pitot's tubes and also for authority to visit the St. Denis Canal and to see the valves put in use.+

I have, etc.,

(Sd) A.W. Smart,

Lieut. Colonel R.E.

+Your letter has remained unanswered as I have been seriously ill and have only just recovered.

The Under Secretary of State for India.

CHIEF ENGR. FOR IRRIGATION
14 MAY 95
No. 957

P.W.756.

India Office,

3rd May 1895.

Sir,

I am directed to acknowledge receipt of your letter of the 30th ultimo requesting that you may be allowed to visit Paris at the expense of the Government for the purpose of making enquiries relative to the purchase of the current meters required by the Madras Government, and also that you may be permitted to visit the St. Denis Canal,

In reply I am to request that you will state what time will be occupied in the enquiries you propose to make.

I am, etc,

(Sd) Clement S. Colvin.

Secretary

Public Works Department.

Lieut. Col. A.W. Smart R.E.,
Hazeldene,
Molyneux Park,
Tunbridge Wells.

CHIEF ENGINEER FOR IRRIGATION.
14 MAY 96
No. 95

Eur 7
3189/95

6 SP

Tunbridge Wells,

6th May.

Sir,

With reference to your No.P.W.756 dated 3rd May 1895 I have the honour to state that the time required for purchasing the Pilot's tubes and for inspecting the St. Denis Canal will be from 10 to 15 days probably - that is if there is no delay on the part of the French engineers. It will be necessary to test the tubes in all probability in the Seine, as it will not do to purchase them without such test.

I have, etc.,

(Sd) A.W. Smart.

The Under Secretary of State
for India.

P.W. Enc 6
810/95
CHIEF ENGINEER
FOR IRRIGATION.
14 MAY. 95
No. 95 Sa

P.W.794.

India Office,

15th May 1895.

Sir,

With reference to your letters of the 30th April and 6th May, I am directed to inform you that the Secretary of State for India sanctions your deputation to Paris on duty with the view of arranging for the purchase of the two current-meters required by the Government of Madras, and also of visiting the St. Denis Canal.

The purchase of the current meters should be effected in communication with the Director General of Stores of this Office, and you are requested to forward a copy of your notes of inspection to this Office, for transmission to the Government of Madras.

During the period of your tour, not exceeding 15 days, you will be allowed 2/3rds of your Indian pay and allowances, together with £1.1.0 a day to cover travelling and subsistence expenses.

The Foreign Office has been requested to furnish the necessary introductions to enable you to obtain the information you require.

I am, etc.,

(Sd) Reay.

Lieut. Col. A.W. Smart R.E.,
Hazeldene,
Molyneux Park,
Tunbridge Wells.

CHIEF ENGINEER
FOR IRRIGATION
14 MAY 96
No. 95-5a

8 SP

Sir,

With reference to your P.W. 900 dated 8th June 1895 I have the honour to forward diary and notes of my visit to Paris for the purchase of Pilot's tubes. My visit extended from 13th June to 25th June inclusive or thirteen days in all. The manufacturer of the tubes Demichel, 24 Rue Pavca au Marcus, Paris had none of the tubes on hand, but I gave him orders to put a set in hand and to forward them when ready to you for transmission to Madras.

Enclosures
Diary & notes
4 plans
2 pamphlets

I enclose plans of the lock valves in use on the St. Denis Canal, as also two pamphlets, from which the descriptive part of my notes has been taken, one, Le Barraye de Luresnes, the other, note sur les nouvelles ecluses du Canal St. Denis.

I have, etc.,

(Sd) A.W. Smart

Lieut. Col. R.E.

The Under Secretary of State
for India.

OFFICE OF ENGINEER
FOR IRRIGATION
14 MAY 96
No. 95 Sa 16

95P

30th August 1895.

Sir,

With reference to your P.W. 1468 dated 29th August 1895 I have the honour to state that my pay when I left India was Rs.1422 per month.

I have, etc.,

(Sd) A.W. Smart

Lieut. Col., R.E.

The Under Secretary of State for India

7UP

CHIEF ENGINEER
FOR IRRIGATION.
14 MAY 96
No. 95 Sa

P.W. 1505.

India Office,

3rd September 1895.

Gentlemen,

In reply to your letter of the 23rd ultimo, I am directed to inform you that, in calculating the special duty pay due to Lieutenant Colonel A.W. Smart, R.E., for the 13 days from the 13th to the 25th June last, in accordance with this Office letter of the 20th ultimo, that officer's Indian pay should be taken as at the rate of Rs.1422 per month.

I am, Etc.,

(Sd) Clement S. Colvin.

Secretary

Public Works Department.

Messrs Cox & Co.,
16 Charing Cross,
S.W.

CHIEF ENGINEER FOR IRRIGATION
14 MAY 96
No. 955a

951.

INDIA OFFICE,

LONDON. 19th SEPTEMBER 1895.

PUBLIC WORKS,

No. 4.

TO HIS EXCELLENCY THE RIGHT HONOURABLE THE GOVERNOR IN COUNCIL FORT ST. GEORGE.

My Lord,

On the receipt of Your Excellency's Public Works Letter No. 10 dated 17th December 1894, Lieutenant Colonel A.W. Smart, R.E. was placed on duty, as desired by your Government, to inspect certain French Canals and rivers and to select two current meters for use on the Godavari Delta Irrigation Works.

2. I now forward a copy of correspondence with Lieutenant Colonel Smart, from which you will learn the terms granted to him and the time which he occupied in carrying out the duty assigned to him. I also transmit the notes and plans which he has submitted.

3. The purchase and despatch of the two current meters required by your Government and selected by Lieutenant Colonel Smart will be arranged by the Director General of Stores of this Office, and a further communication conveying

Letter to Colonel Smart dated 11th January 1895.
Letter from Colonel Smart dated 30th April 1895.
Letter to Colonel Smart dated 3rd May 1895.
Letter from Colonel Smart dated 6th May 1895.
Letter to Colonel Smart dated 15th May 1895.
Letter from Colonel Smart undated (enclosures in original)
Letter from Colonel Smart dated 30th August 1895.
Letter to Messrs. Cox & Co. dated 3rd September 1895.

conveying the information asked for in
the 2nd paragraph of your letter will
be addressed to you later.

I have the honour to be,

My Lord,

Your Lordship's most obedient humble Servant,

George Hamilton

A. W. CURRENT No. 8169

Recd: 23.10.95

No 8

15 C
Encl 15

CHIEF ENGINEER
FOR IRRIGATION.
14 MAR. 96
No 9559

(+ 2 books, 1 Tracing + 3 plans)

Public Works.

19th September 1895.

The Letter to Dot St. George

No 4.

Ry 88a
3

32 BW
12 Sept 95

148

Rec'd 11-10-95