

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 1248 (Ry)	Press Mis.
Dated 20-4-1877.	

Not to be folded or roughly handled

Read the following papers:—

No. 467. From Major-General M. K. KENNEDY, R.E., Secretary to the Government of Bombay, Public Works Department, (Railway,) to the Secretary to the Government of Madras, Public Works Department, (Railway,) dated Bombay Castle, 2nd April 1877, No. 514.

I AM directed to acknowledge the receipt of your letter No. 1,006, dated 23rd March, and to forward, for the information of the Government of Madras, copy of Resolution of this Government, No. 513, dated 2nd instant, directing Major Jopp, R.E., to act under instructions from Madras in respect to the matters specified by you.

2. As regards the Junction Station at Bellary, the opinion entertained by Lieutenant-Colonel Shaw-Stewart and Mr. Molesworth was previously expressed by Lieutenant-Colonel Hancock in paragraphs 26 and 31 of his note on Mr. Shaw's report, dated 15th December 1873.

Proceedings of the Bombay Government in the Public Works Department, (Railway,) dated Bombay Castle, 2nd April 1877, No. 513.

Read the following letter from the Joint Secretary to the Government of Madras, Public Works Department, Railway, No. 1,006—606—76 R, dated 23rd March 1877:—

With reference to your letter No. 303, dated 27th February 1877, inquiring what the views and wishes of the Madras Government are regarding the general direction to be followed by the proposed railway from Bellary to Gadak, I am directed to state that, of the two lines surveyed, His Grace the Governor in Council accepts the direct line *via* Copal, as recommended by the Bombay Government.

2. Two points, however, in connection with the Bellary end of the line require notice; first, that the proposed line, instead of being kept to the south of the Bellary Fort and joining the Madras Railway at the west end of their present station, has been taken considerably to the north of the Fort and is joined to the Madras Railway by a reverse curve at the east end of the station; second, that it is proposed to have a second station at Bellary for the new line, instead of making use of the large extent of accommodation available in the Madras Railway yard. The distance from the present station to the proposed one is nearly one mile, and the intervening gradient is 1 in 100.

3. These two points are dealt with at pages 8 and 9 of Mr. Shaw's report. The Consulting Engineer for Railways in this Presidency met Mr. Molesworth at Bellary, and communicated to him the views held by the Madras Government upon those points. It is understood that Mr. Molesworth concurs in those views, and an inspection of the station yard showed that there was ample room for both railways, and that all necessary arrangements could be made without difficulty.

4. I am further directed to state that, after the line has been marked out, the officers employed in superintending the construction of earthwork between Bellary and Toongabudra river should, in the opinion of this Government, receive their instructions from Madras. In the event of Madras labor being employed upon the earthwork of

the section which lies within the dominions of His Highness the Nizam, the officers in charge should in like manner receive instructions from this Government.

RESOLUTION.—To be communicated to the Consulting Engineer for Railways, for information and guidance.

2. Major Jopp, R.E., should be directed to carry out such instructions, as he may receive from time to time from the Consulting Engineer for Railways, Madras, in respect to the alignment of the Railway through, and in the vicinity of Bellary, and the junction with the Madras Railway at that station; and also in respect of all arrangements connected with the construction of the earthwork between Bellary and the Toongabudra, and in the Nizam's dominions between the Toongabudra and the Dharwar frontier should relief labor from Madras be employed there.

(Signed) H. F. HANCOCK, Lieut.-Col., R.E.,
Under Secretary to Government.

No. 467-A. Endorsement of the Consulting Engineer for Railways, dated Madras, 7th April 1877, No. 213.

BELLARY AND HUBLI RAILWAY.

Inspection Note by the Consulting Engineer to the Government of India for State Railways.

As a general rule the gradients, as shown on Mr. Shaw's section, skirt the ground too closely and throw the line too much into cutting, an objectionable feature especially in a black cotton soil. The places at which this occurs are too numerous to specify in detail, but I have marked on the section a large number of alterations of gradient, which will require careful consideration in setting out the work. They must, however, be accepted rather as indications of the general character of alterations I would suggest than as final adoptions; each case should be considered by itself on the ground, as the character of the soil may in some cases modify the nature of the gradient.

The line appears to be set out with good judgment generally, especially in the valley between Gushigenoa and the Tongabudra river, and an excellent line has been obtained through the pass of Papananaskanahully.

The earthworks on the line throughout will be very light.

I recommend the adoption of the direct route through the Nizam's dominions, it is not only 13 miles shorter, but mile for mile it will be less expensive, and I doubt whether the bridge over the Tongabudra river on the direct route could be more expensive than that on the Dimal route.

I quite agree with Colonel Hancock that there should not be separate stations at Bellary for the broad and metre gauge railways. There is no reason why the narrow gauge railway should not run into the Madras Railway station at Bellary, but Mr. Shaw's line is not suited for the purpose, and would entail the drawback of a reversing arrangement at the foot of a long gradient of 1 in 100.

An excellent line has been surveyed by the Madras Railway officers in continuation of their line, and this may, with some slight modifications which I have pointed out, be adopted for the Hubli and Bellary Railway; it may be easily made,

the gradients are good, and it runs through no valuable property, and Colonel Shaw-Stewart tells me that the Military authorities have approved of it. The adoption of this line will alter the line between the 86th and 92nd miles, or for about 4 or 5 miles from Bellary, as approximately shown by the blue line marked A on the map. There is ample room for the joint station within the property taken up for the Madras Railway Station at Bellary.

I would run a passenger line behind the passenger platform of the Madras Railway, so as to have the platform common to both Railways, and the goods line branching off from the passenger line, outside the station, would run to the north of a building called a "carriage shed" to a transfer platform, on either side of which the broad and metre gauge sidings would respectively run.

A local goods shed for the metre gauge railway might be established on the north of the goods line near the cemetery, and the "carriage shed" might be taken up as a locomotive running shed for the metre gauge railway. This shed appears to be little used; but if still thought to be necessary by the Madras Railway authorities another similar to it might be erected elsewhere in an equally convenient situation.

From the 85th mile to the 49th mile (the crossing of the Toongabudra) I propose no alterations beyond gradient alterations above mentioned, and possibly a slight modification at the Daroga tank marked B in the accompanying map.

For the crossing of the Tongabudra river I propose to adopt a line substantially the same as that proposed by Mr. Shaw, the only alteration being a slight modification in detail, shifting the line lower down the stream about 150 feet at one bank and 50 feet at the other. I would, moreover, reduce the length of the bridge from 2,300 to about 1,900 feet or thereabouts. I find I can do this without materially reducing the actual water-way of the river, and the obstruction formed by the piers of the bridge will be more than compensated for by a judicious arrangement for quarrying the building stone from the site of the bridge as the stone there is all that could be desired.

I quite agree with Colonel Hancock in his preference for stone arches for this and other works on this line, and I would propose for this crossing a bridge of about 34 spans of 50 feet in the clear, instead of the 23 spans of 82 feet girders (from centre to centre) as proposed by Mr. Shaw.

When I say "about 34 spans," I mean that such a bridge would be sufficient for the purposes of an estimate, but the bridge itself should be designed so as to render available in the best manner some large masses of granite which project above the general rocky bed of the river. These masses may with advantage be used for the construction of abutment piers possibly in combination with spans smaller than the typical span, whilst a foot or two of alteration more or less in the typical span may enable a judicious spacing of the piers to be adopted, but whatever be adopted as the typical span it must be carried throughout to economise in centering, with the exception of any smaller spans that may be inserted in combination with abutment piers as above mentioned.

Beyond the crossing of the Tongabudra I have suggested the trial of an alternative line between the 48½ and 42nd miles, marked C in the map. The object of this alternative line is to save length and to avoid two crossings of the main road from Copul, but as Mr. Shaw's line is very light between these two points the alternative line should not be adopted unless the works are light on it also.

If this alternative line should not prove to be feasible I would propose a short deviation of about a mile in length between the 48th and 49th miles, to substitute a 40 for a 20 chain curve, and to avoid some low ground. From the 42nd mile to Copul Mr. Shaw's line may be accepted, but at Copul I would propose a deviation, marked D on the accompanying map, to secure a better crossing of the "Burra nulla." Where Mr. Shaw's line crosses the foundations are bad, and he proposes to have recourse to wells for the piers of his bridge, whilst on the deviation I propose there is every reason to believe that a good rock foundation may be secured close to the surface. I propose at this point to divert the Burra nulla, baring the rock and blasting some of it away for stone to be used in the construction of the bridge. I also think that in this position the length of the bridge may probably be reduced from 600 to 500 feet. Stone arches should be adopted for this bridge if my conjectures respecting the altered bridge site should be realized.

Between the Burra nulla and Guddud it will be necessary to make some further trial sections before Mr. Shaw's line can be accepted. Between the "Burra nulla" and Tullaculloo probably little alteration will be necessary beyond that which is necessary to approach the deviations at either end of this length, but between Tullaculloo and Hurlapore I think it very probable that a better line may be obtained by keeping on the water shed, in a line of which the direction would probably be generally parallel to Mr. Shaw's, but about a mile to the north of it. This line is indicated on the accompanying map by the line marked E E. In fact Mr. Shaw in his report states that the line may be improved at that part by keeping more on the water-shed. If water can be found on the water-shed for a station the line may be kept up on the highest ground until Hurlapore has been passed, if, however, it is not to be obtained then it may be necessary to descend to Hurlapore for a station by the dotted blue line marked F on the map. A set of Norton's tube wells would be useful in examining the ridge for water.

Between Guddud and Amijeree I would suggest the trial of an alternative line marked G on the plan, the object of this line is to save length and to avoid a heavy cutting and embankment near Belchop.

I have also suggested the trial of another deviation between Amijeree and Hubli passing through Doondoor, and thence about a mile east of Koorjul, with the object of sewing in waterways, but in this as well as in other suggested deviations Mr. Shaw's original line is so light that the deviations must be light also to be adopted. The water-ways on the line will require careful reconsideration, but for the purposes of estimate they appear to me to be very ample.

The number of level crossings provided by Mr. Shaw appears, as Colonel Hancock observes, to be insufficient. Judging from the number of cart wheels about I think there should be provision for at least two per mile of railway.

BOMBAY, (Signed) GUILFORD L. MOLESWORTH.
31st March 1877.

FORWARDED with Mr. Molesworth's compliments to the Consulting Engineer for Railways, Madras.
BOMBAY.
3rd April 1877.

SUBMITTED for the information of Government with two sheets of the Indian Atlas, showing the lines proposed for the Railway.

(Signed) J. H. M. SHAW-STEWART, Lieut.-Col., R.E.,
Consulting Engineer for Railways.

No. 468. ORDER THEREON, 20th April 1877, No. 1,348.

RAILWAY, No. 65.

ORDERED to be recorded.

(True Extract.)

Lieut.-Col., R.E.,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
„ Revenue Department.

Erd. S. T. Austin.
Spare Copies

Railways.—Hubli and Bellary Railway.
Executive Engineer in charge, to carry
out instructions of Madras Govern-
ment.

No. 513 of 1877.

P. W. Department.
Railway.

Bombay Castle,
2nd April 1877.

Read the following letter from the Joint Secretary to the Government of Madras, Public Works Department, Railway, No. 1006—606—76 R., dated 23rd March 1877:—

With reference to your letter No. 303, dated 27th February 1877, inquiring what the views and wishes of the Madras Government are regarding the general direction to be followed by the proposed railway from Bellary to Gadak, I am directed to state that, of the two lines surveyed, His Grace the Governor in Council accepts the direct line *via* Copal, as recommended by the Bombay Government.

2. Two points, however, in connection with the Bellary end of the line require notice; first, that the proposed line, instead of being kept to the south of the Bellary Fort and joining the Madras Railway at the west end of their present station, has been taken considering the Madras Railway at the west end of the Fort and is joined to the Madras Railway by a reverse curve at the east end of the station; second, that it is proposed to have a second station at Bellary for the new line, instead of making use of the large extent of accommodation available in the Madras Railway yard. The distance from the present station to the proposed one is nearly one mile, and the intervening gradient is 1 in 100.

3. These two points are dealt with at pages 8 and 9 of Mr. Shaw's report. The Consulting Engineer for Railways in this Presidency met Mr. Molesworth at Bellary, and communicated to him the views held by the Madras Government upon those points. It is understood that Mr. Molesworth concurs in those views, and an inspection of the station yard showed that there was ample room for both railways, and that all necessary arrangements could be made without difficulty.

4. I am further directed to state that, after the line has been marked out, the officers employed in superintending the construction of earthwork between Bellary and Toongabudra river should, in the opinion of this Government, receive their instructions from Madras. In the event of Madras labor being employed upon the earthwork of the section which lies within the dominions of His Highness the Nizam, the officers in charge should in like manner receive instructions from this Government.

RESOLUTION.—To be communicated to the Consulting Engineer for Railways, for information and guidance.

2. Major Jopp, R.E., should be directed to carry out such instructions as he may receive from time to time from the Consulting Engineer for Railways, Madras, in respect to the alignment of the Railway through, and in the vicinity of Bellary, and the junction with the Madras Railway at that station; and also in respect of all arrangements connected with the construction of the earthwork between Bellary and the Toongabudra, and in the Nizam's dominions between the Toongabudra and the Dharwar frontier should relief labor from Madras be employed there.

H. F. HANCOCK, Lieut.-Colonel, R.E.,
Under Secretary to Government.

To *The P. W. Department, Secy. to Govt.*
The Consulting Engineer for Railways.
Major Jopp, R.E., Executive Engineer in charge Hubli-Bellary Railway
Survey.

No. 514 OF 1877.

P. W. DEPARTMENT.
RAILWAY.

Bombay Castle, 2nd April 1877.

FROM

THE SECRETARY TO THE GOVERNMENT OF BOMBAY,

TO

THE SECRETARY TO THE GOVERNMENT OF MADRAS.

SIR,

I am directed to acknowledge the receipt of your letter No. 1006, dated 23rd March, and to forward, for the information of the Government of Madras, copy of Resolution of this Government, No. 513, dated 2nd instant, directing Major Jopp, R.E., to act under instructions from Madras in respect to the matters specified by you.

2. As regards the Junction Station at Bellary, the opinion entertained by Lieut.-Colonel Shaw Stewart, and Mr. Molesworth, was previously expressed by Lieut.-Colonel Hancock in paragraphs 26 and 31 of his note on Mr. Shaw's report, dated 15th December 1873.

I have the honor to be,

Sir,

Your most obedient Servant,

W. E. Jopp
Major-General, R.E.,
Secretary to Government.

46 20 April 1877

Acknowledges Government of India's letter No. 1006 of 1877, on the subject of the proposed Railway from Bellary to Gadak, and forwards copy of Bombay Government Resolution No. 513 of 1877.

4620. *Hyph. p. 11* 10. 11. 16

Eni 10-4-77

Bellary and Hobble Railway

Inspection note by the Consulting Engineer to the Government of India for State Railways

As a general rule the gradients as shown on the Shaw's section skirt the ground too closely and throw the line too much into cutting, an objectionable feature especially in a black cotton soil. The places at which this occurs are too numerous to specify in detail, but I have marked on the section a large number of alterations of gradient which will require careful consideration in setting out the work. They must however be accepted rather as indications of the general character of alterations I would suggest, than as ^{final} ~~adoptions~~ ^{adoptions}; each case should be considered by itself on the ground, as the character of the soil may in some cases modify the native

nature of the gradient

The line appears to be set out with good judgment generally, especially in the valley between Gushfiroa and the Longabudra River, and an excellent line has been obtained through the pass of Kapanuaskanaully.

The earthworks on the line throughout will be very light.

I recommend the adoption of the direct route through the Nagani's divisions, it is not only 13 miles shorter but mile for mile it will be less expensive and I doubt whether the bridge over the Longabudra river on the direct route could be more expensive than that on the direct route.

I quite agreed with Colonel Hancock that there should not be separate stations at Bellary for the broad and metre gauge railways - There is no reason why the narrow gauge

railway should not run into the Madras Railway Station at Bellary but the line is not suited for the purpose and would entail the drawback of a reversing arrangement at the foot of a long gradient of 1 in 100.

An excellent line had been surveyed by the Madras Railway officers in continuation of their line and this may with some slight modifications which I have pointed out be adopted for the Hoobli and Bellary Railway. It may be easily made, the gradients are good and it runs through no valuable property, and Colonel Shaw Stewart tells me that the military authorities have approved of it. The adoption of this line will alter the line between the 80th and 92 miles or for about 4 or 5 miles from Bellary as approximately shown by the blue line.

line marked A on the map.

There is ample room for the joint station within the property taken up for the Madras Railway Station at Bellary.

I would run a passenger line behind the passenger platform of the Madras Railway so as to have the platform common to both railways, and the goods line branching off from the passenger line, outside the station, would run to the north of a building called a carriage shed, to a transfer platform, on either side of which the broad and metre gauge sidings would respectively run. A local goods shed for the metre gauge railway might be established on the north of the goods line near the carriage and the carriage shed might be taken up as a locomotion running shed for the metre

metre gauge Railway. This shed appears to be little used, but if still thought to be necessary by the Madras Railway authorities another similar one might be erected elsewhere in an equally convenient situation. From the 80th mile to the 19th mile of the crossing of the Longabudra I propose its alterations beyond the gradient alterations above mentioned, and possibly a slight modification at the Baroga. I marked B in the accompanying map. For the crossing of the Longabudra River I propose to adopt a line substantially the same as that proposed by Mr. Shaw, the only alteration being a slight modification in detail, shifting the line lower down the stream about 150 feet at one bank and 50 feet at the other. I would moreover reduce the length of the bridge from 2300 to about 1900 feet.

feet or thereabouts. I find I can do this without materially reducing the actual waterway of the river and the obstruction formed by the piers of the bridge will be more than compensated for by a judicious arrangement for gearing the building stone from the site of the bridge as the stone there is all that could be desired.

I quite agree with Colonel Hancock in his preference for stone arches for this and other works on this line and I would propose for this crossing a bridge of about 34 spans of 58 feet in the clear instead of the 28 spans of 82 feet (center to center) as proposed by Mr. Shuro.

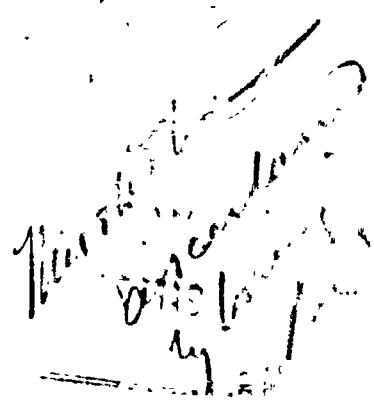
When I say about 34 spans I mean that such a bridge would be sufficient for the purposes of an estimate but the bridge itself should be designed so as to render available in the best manner some large masses

of granite which project above the general rocky bed of the river. These masses may with advantage be used for the construction of abutment piers possibly in combination with spans smaller than the typical span whilst a foot or two of alteration more or less in the typical span may enable a judicious spacing of the piers to be adopted but whatever be adopted as the typical span it must be carried throughout to economize in construction with the exception of any smaller spans that may be inserted in combination with abutment piers as above mentioned.

Beyond the crossing of the Singabudra I have suggested the trial of an alternative line between the 48th and 42nd miles marked C in the map. The object of this alternative line is to save length and to avoid two

two crossings of the main road
from Copul, but as Mr. Shaw's line
is very light between these two points
the alternative line should not be
adopted unless the works are light.
or it also.

If this alternative line should not
prove to be feasible I would propose
a short deviation of about a mile
in length between the 48th and 49th
miles to substitute a 40 for a 20 chain
curve and to avoid some low ground.
From the 42nd mile to Copul Mr. Shaw's
line may be accepted but at Copul
I would propose a deviation marked
on the accompanying map to se-
cure a better crossing of the "Burra
mulla" where Mr. Shaw's line
crosses the foundations are hard
and he proposes to have recourse
to wells for the piers of his bridge
whilst on the deviation I propose
there is every reason to believe that
a



a good rock foundation may be
secured close to the surface. I
propose at this point to divert the
Burra mulla bearing the rock and
blasting some of it away for stone
to be used in the construction of the
bridge. I also think that in this
position the length of the bridge may
probably be reduced from 600 to 500
feet. Stone arches should be adopt-
ed for this bridge if my conjecture
respecting the altered bridge site should
be realised.

Between the Burra mulla and
Lullacilloa it will be necessary to make
some further trial sections before
Mr. Shaw's line can be accepted.
Between the "Burra mulla" and
Lullacilloa probably little altera-
tion will be necessary beyond that
which is necessary to approach the
deviations at either end of this length
but between Lullacilloa and Thirlafone

I think it very probable that a better line may be obtained by keeping on the watershed in a line of which the direction would probably be generally parallel to Mr. Shaw's but about a mile to the north of it. This line is indicated on the accompanying map by the line marked E E. In fact Mr. Shaw in his report states that the line may be improved at that part by keeping more on the water shed. If water can be found on the water shed for a station the line may be kept up on the highest ground until Hurlapoor has been passed if however it is not to be obtained then it may be necessary to descend to Hurlapoor for a station by the dotted blue line marked F on the map.

A set of Norton's tube wells would be useful in examining the ridge for water.

Between

Between Guided and Angire
would suggest the trial of an alternative line marked G on the plan, the object of this line is to save length and to avoid a heavy cutting and embankment near Belchop.

I have also suggested the trial of another deviation between Angire and Hoobli passing through Doondar and thence about a mile east of Koorful with the object of saving in water ways but in this as well as in other suggested deviations Mr. Shaw's original line is so light that the deviations must be light also to be adopted. The water ways on the line will require careful consideration but for the purposes of estimate they appear to me to be very ample.

The number of level crossings provided by Mr. Shaw appears as.

360

P.W.D.

SLFR77

3687

912 Noel
1877:

Forwarded with Mr. Mohanlal's
compliments to the Com. Eng. for
Rathways Madras.

7. April. III.

Monday

3/4/77

Ly 20: April 11. 1884. 467

PUBLIC WORKS DEPARTMENT,

Railway Branch..

Consulting Engineer's Office

Madras.

7th April, 1871

Bellevue and Public Railway

Inspection made by the Consulting Engineer to the Government of Sweden for State Railways dated 31 March 1877.

No. 273

SUBMITTED

for the information of Government
with two sheets of the Indian Atlas
showing the lines proposed for the
Railway

Wierzbicki

Spencer

Intimus prope

with Inapt note

Report on the Khannashine
2 Atlas sheets
Cus: 3589 and 3600

P.W.D.

9 APR 77

3681

The Comd^g Eng^r for Railways

Dated 7th April 1877.

No 213.

Encl: 2 X 2

Atlas sheet to send
to the Comd^g of
order of 2nd April

- 2396- 20-9-71
- 2397- 20-9-71
- 2780- 3-11-71
- 3049- 2-12-71
- 3050- 2-12-71
- 2457- 18-10-72
- 2458- 18-10-72
- 2459- 11-12-72
- 2927- 11-12-72
- 2980- 16-12-72
- 2981- 16-12-72
- 430- 10-6-73
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- 2928- 5-12-73
- 3066- 20-12-73
- 3066A- 20-12-73
- 3066B- 20-12-73
- 457- 24-2-74
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- 893- 13-3-74
- 1078- 28-4-74
- 1517- 10-6-74
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- 2029- 28-7-74
- 2030- 28-7-74
- 3251- 17-11-74
- 106- 13-1-75
- 2108- 11-8-76
- 2109- 11-8-76
- 214- 14-2-77
- 436- 28-2-77
- 96- 1005- 23-3-77
- 1006- 23-3-77

By 20 April 77 J.B.R. 467

Recd 10-4-77

P. W. DEPARTMENT.

Read the following:—

From the Consulting
Engineer for Railways No. 213
dated 7 April 1877.

FOR ORDERS.

Manturawl

Head Qrs.
Dist Secy to Govt.
P.W.D. By Branch.

1880/1
3439/1
Govt. of India
PUBLIC WORKS.

To: *The Commr. Engrs. & Archts.*

Dated: *21/4*

Issued: *File*

Encl.

G. O., 26th April 1877, No. 1348

W. No. 467-468

Bellary. Public Railway
Inspection note by the
Comr. to the Engrs. India
for State Railways on
the —, recorded.

1901

Staff in Reg.

*List under
order No 1348 of 20 April*

*Ordered to be
recorded.*

W.

*C. E. for Reg.
Recd. Dept.
recd. 1-5-77
C. E. 10-4-77*