

Public Works (1894) Department.

RAILWAY BRANCH.

G.O., No. 193 · R

DATED 29th March

[Despatch Abstract.]

Madras Railway

Report of inquiry held into the alleged arrival at Arkonam of No 32 Train of 25th February 1894 from Tiruchani without the line being blocked, recorded and the attention of the Agent drawn to the frequent failures of block working in the

Indexed

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G.O.	No.	Department.	Date.

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GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

Read the following paper :—

Present.

Description.

Evidence.

These deflections lasted from 13-10 until 13-25. Kátpádi on being asked replied that he observed deflections on all circuits from 13-10 till 13-18—see copies of replies.

Mr. Andrews states that he had given authority for the line to be blocked for No. 32 by signing his name in the register book in the proper column, but no time is entered against the signature, and signaller Ritchie denies that the signature was made before the arrival of the train.

Signallers Ritchie and Demant and train clerk Singaram state that they were in the office between 13 o'clock and the arrival of the train at Arkonam, and all say that no exchange of signals took place between Arkonam and Tirutani during that time.

The evidence of the stationmaster at Tirutani is to the effect that the line was blocked to

Arkonam for No. 32 train on 25th instant in the usual manner. He noticed nothing irregular or unusual in the working of either the needle or the block instruments on the date in question before the arrival of the train; but on the previous day (24th instant) he had some difficulty in getting Arkonam when blocking the line for No. 38 train at about 9-28. On the 25th instant also, after the departure of the 18-0 mail from Tirutani, he heard several successive irregular beats on the block instruments.

He says that he saw the starting semaphore correctly lowered to caution before the train started.

His evidence is corroborated by the assistant stationmaster. Both guards state that they saw the block needle "on line," and the fact of the semaphore having been lowered to caution is not denied by any one.

Mr. Theobald states that, when he arrived at Tirutani, the black needle of the block instrument connected with Arkonam was "on line." Mr. Winter and Mr. Ross then pulled lever and found the semaphore arm locked at danger. They then went to the semaphore and tested it and found all correct. Mr. Winter, Mr. Ross and the Divisional Inspector were present at the semaphore.

After Messrs. Winter and Ross had left Tirutani, the effects of earth currents were observed on all three instruments at Tirutani.

Venkatachellum confirms Theobald's statements above and further states that the block instrument connected with Arkonam was opened and examined by himself and Mr. Winter and it was found that the line relay tongue was in the normal position and the semaphore relay tongue in the reverse position.

Finding.

There were strong earth currents affecting all instruments on Saturday the 24th

• Kátpádi says 13-16.

and 13-25 o'clock on the 25th. Arkonam instant and, according to accounts received from Arkonam and confirmed by Kátpádi, the same thing took place between 13-10 and 13-25 or at the time that the train was at Tirutani. This deflection was caused by a current in the same direction as that which is sent from Arkonam to Tirutani on giving the "line clear" signal, and would put Tirutani's line relay in such a position as to cause the semaphore to be unlocked and the black needle to be deflected to "on line" if Tirutani lifted the covering switch and pressed the button and the plunger in the ordinary way of giving a "line is clear" acknowledgment. On the arrival of Messrs. Winter and Ross at Tirutani it was found that the black needle of the instrument connected with Arkonam was at "on line" and the semaphore was locked at danger, which shows that the above mentioned operations had been performed, and presumably it was raised in the ordinary course by the train itself.

Block instruments were set up in the Telegraph Engineer's office and so connected with a needle instrument as to demonstrate the action of the earth currents. It was shown that if, while a current in the direction it was stated by Arkonam to have been flowing on the afternoon in question were made to flow through the block instruments, the hammers of both block instruments would be pressing against the bell. It was further shown that, after each pressure of the plunger, a beat on the bell of the same instrument would be heard on the release of the plunger, but that little or no effect would be produced on the bell of the distant block instrument.

Thus if, while the current were flowing, the signal "is line clear" were given, practically the same signal would be received back on the bell of the same instrument, but the beats would be intermediate between the successive pressures of the plunger.

It was also shown that if, while a current deflecting the needle to the right was flowing through the block instruments, the instrument representing that at Tirutani were manipulated in the ordinary way of acknowledging a "line is clear" signal, the semaphore connected with it would be unlocked and the needle placed to "on line," but that no effect was produced unless the covering switch were raised and the button pressed while giving the acknowledging signal.

With the exception of the President, we are of opinion that the stationmaster went through the form of asking "is line clear" and accepted the beats that he would receive whilst doing so (although these were merely a repetition of his own signals and received while he was himself signalling) as the "line clear" signal

from Arkonam. Further, that on lifting the cover switch and pressing the button and plunger the black train-going needle went to "on line" and the semaphore was unlocked.

The irregularities brought to notice in connection with the entries in the block register book at Arkonam will be taken notice of by the Divisional officer.

(Signed) J. L. TAYLOR,
Asst. Traffic Manager.

(") E. E. LEFEBURE,
Ag. Dy. Loco. Superintendent.

(") ROSS CHISHOLM,
Resident Engineer.

(") E. R. ROSS,
Asst. Traffic Manager, in charge
of Division at the time.

The President agrees with this opinion with the exception that he considers that no trained block signaller or stationmaster would be thus misled, but that such a mistake could only have been made by some unauthorized person.

(Signed) G. K. WINTER,
Telegraph Engineer, President.

Remarks of Government Inspector of Railways.

It is clear from the evidence of the station staff at Arkonam that the "line clear" had not been given by Arkonam to Tirutani for No. 32 train, and the staff all stated their surprise at the arrival of the train. The running staff of the train were equally surprised on being informed, on arrival, by the stationmaster of Arkonam that their train had passed over the section from Tirutani without the line being blocked. The driver held the usual line clear ticket and both guards had seen the needle of the block instrument at Tirutani pointing to "on line." The Telegraph Engineer, Assistant Traffic Manager and others, who proceeded by the first opportunity to that station, corroborate this statement; they also found the semaphore locked at danger which showed that it had been lowered after certain operations detailed below had been performed. There is abundant evidence that the needle of the Arkonam instrument pointed to "cleared line."

The question then arises as to how it was possible for the needle of the Arkonam instrument to point to "line clear," while that of the connected instrument at Tirutani pointed to "train on line."

It is certain that between 13-00 and 13-30 powerful earth currents were prevalent, affecting all instruments and causing the block bells to ring irregularly and the Morse needles to deflect. In the train register book at Arkonam a remark to this effect was made at the time: Corroborative reports were received from other stations also.

It was practically demonstrated to the committee by Mr. G. K. Winter, the Company's Telegraph Engineer, that under the then existing magnetic conditions this irregularity was possible.

The magnetic storm then prevailing was passing in the same direction as that in which a current would be sent from Arkonam to Tirutani when giving the line clear signals.

If, as there is no reason to doubt, Tirutani sent the usual signal asking is line clear 1, 2, 1, -1, 1, - his own bell would reproduce the beats almost simultaneously. If now Tirutani, assuming these beats to be the acknowledgment from Arkonam, lifted the covering switch and pressed the button and plunger, the action of the earth current, would then unlock the semaphore and deflect his needle to "on line."

This seems to be the only plausible solution. The "line is clear" signal from the advance station is 2-2-1-1 which would in the ordinary course of affairs be received after an appreciable interval of time had elapsed after the "is line clear" signal had been sent.

I have therefore come to the conclusion that the stationmaster at Tirutani mistook his own signal "echo" for the reply from Arkonam and accordingly went through the remaining operations necessary to start the train.

In accepting these signals the stationmaster, Tirutani, is guilty of gross carelessness, there being no similarity between them and the authorised signals.

The previous character of this man confirms the above conclusion, he having been on several occasions punished for carelessness.

In the finding of the committee no blame is attached to the stationmaster or any other person, although their conclusion is the same as the above.

MADRAS,
8th March 1894.

(Signed) C. T. R. SCOVELL,
Government Inspector of Railways.

Remarks by Senior Government Inspector.

The finding of the President Mr. Winter practically confirms Mr. Scovell's opinion but indirectly. There have been in 8 months 4 cases of trains running without line clear on the Madras Railway—

- (1) On 15th July 1893 between Kódúr and Urampád.
- (2) On 21st August 1893 between Gooty and Patakattacheru.
- (3) On 31st October 1893 between Vániyambádi and Jalarpet.
- (4) On 24th February 1894 between Arkonam and Tirutani.

As the Madras Railway has the absolute block over and above the ordinary line clear system, it should be practically safeguarded against trains running without line clear. I desire to draw the Agent's attention to these 4 serious irregularities. It does not seem possible that an accident to the train could have occurred in this particular case, but it is chiefly because of the frequency of these cases that stringent measures are necessary.

MADRAS, CHEPÁK,
10th March 1894.

(Signed) F. R. UPCOTT,
Senior Govt. Inspector for Railways.

Endorsement of the Consulting Engineer for Railways, dated 29th March 1894.
No. 15.

Submitted for the information of Government.

ORDER—dated 29th March 1894, No. 193 R., Public Works.

Recorded.

2. The serious attention of the Agent and Manager should be drawn to the frequent failures of block working in the Madras Railway.

(True Extract.)

(Signed) F. R. UPCOTT,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Agent and Manager, Madras Railway,
through the Consulting Engineer for Railways.

Exd. B. J. Pereira.
Spare Copies

RAILWAY.

Gobt. of {1894} Madras.
PUBLIC WORKS.

Dated March, 29th.

Recd.

Encl.

G.O., 29th Mar. 1894, No. 193 R.

MARCH.

Madras Railway

Report of inquiry held into the alleged arrival at Arkonam of No. 32 train of 25th February 1894 from Tirutani without the line being blocked, recorded, and the attention of the Agent drawn to the frequent failures of block working in the —.

Joint Enquiry held at Arkonam on 28th February and 1st March 1894 into alleged arrival at Arkonam of No. 32 train of 25th February 1894 from Tirutani without the section having been blocked.

Present

J. W. Winter Esq. Telegraph Engineer. President
E. J. P. Scovell Esq. Deputy Consulting Engineer
J. L. Taylor Esq. Asst. Traffic Manager
Ross Chisholm Esq. Resident Engineer
E. E. Lefebvre Esq. Ag. Deputy Secy. Superintendent
E. R. Ross Esq. Asst. Traffic Manager.

Summary

On Sunday the 25th February 1894, on arrival of the No. 32 train it was reported by the Station Master to all concerned that the train had passed over the section between Tirutani and Arkonam without the line being blocked. The Red needle of the Arkonam instrument was at "cleared line" and it was found on arrival of Messrs Winter and Ross at Tirutani that the "Black Needle" of the Arkonam section instrument was at "on line". The Semaphore was next examined and found to be locked at Danger and to be in perfect order. The block instrument was opened and examined and it was found to be in order also, and ultimately testing signals were exchanged and Block Working resumed. A preliminary enquiry was held, the evidence given being practically the same as far as it went as that tendered at the Joint Enquiry.

Evidence

Evidence

The Station Master of Arkonam states that, on hearing the whistle of the N° 32 train outside the distant signal, and not having heard the warning bell, he went into the Telegraph Office and found both needles at cleared line; the position of the needles is corroborated by Signallers Ritchie and Demonte as well as by the Train Clerk Singaram who is in A. T. his office.

Signaller Ritchie states that he was at no time called on the Block Instrument by Tirutani for blocking N° 32 train but that he heard one beat on the bells of both Block Instruments at about 13.15 O'clock and afterwards a trembling of the hammer against the bell. This is corroborated by Signaller Demonte. They also state that at about the same time the needles of all speaking instruments were deflected to the right - showing the existence of earth currents.

These deflections lasted from 13.10 until 13.25. Ratpadi on being asked replied that he observed deflections on all circuits from 13.10 till 13.18. See copies of replies.

Mr. Andrews states that he had given authority for the line to be blocked for N° 32, by signing his name in the Register Book in the proper column, but no time is entered against the signature, and Signaller Ritchie denies that the signature was made before the arrival of the train.

Signallers Ritchie and Demonte and
Train

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Train clerk Singaram state that they were in the office between 13.0'clock and the arrival of the train at Arkonam; and all say that no exchange of signals took place between Arkonam and Tirutani during that time.

The evidence of the Station Master at Tirutani is to the effect that the line was blocked to Arkonam for N. 32 Train on 25th instant in the usual manner. He noticed nothing irregular or unusual in the working of either the needle or the block instruments on the date in question before the arrival of the train, but on the previous day (24th instant) he had some difficulty in getting Arkonam when blocking the line for N. 36 Train at about 9.26. On the 25th instant also after the departure of the 10.0 Mail from Tirutani he heard several successive irregular beats on the block instruments.

He says that he saw the starting Semaphore correctly lowered to caution before the train started.

His evidence is corroborated by the Assistant Station Master. Both Guards state that they saw the block needle "on line" and the fact of the Semaphore having been lowered to caution is not denied by any one.

Mr. Theobald states that when he arrived at Tirutani the block needle of the Block Instrument connected with Arkonam was "on line". Mr. Winter and Mr. Ross then pulled lever and found the Semaphore arm locked at Danger. They then went to the

Semaphore

Semaphore and tested it and found all correct. Mr. Winter, Mr. Ross and the Divisional Inspector were present at the Semaphore.

After Messrs Winter and Ross had left Tirutani the effects of earth currents were observed on all three instruments at Tirutani.

Venkatachellum confirms Sheela's statements above and further states that the Block Instrument connected with Arkonam was opened and examined by himself and Mr. Winter and it was found that the line relay tongue was in the normal position and the semaphore relay tongue in the reverse position.

Finding

There were strong Earth currents affecting all instruments on Saturday the 24th inst and according to accounts received from Arkonam and confirmed by Katpadi the same thing took place between 13.10 and 13.25 6/1 clock on the 25th. Arkonam says that the needle instruments were deflected to the right between the hours of 13.10 and 13.25 or at the time that the train was at Tirutani. This deflection was caused by a current in the same direction as that which is sent from Arkonam to Tirutani on giving the 'line clear' signal, and would put Tirutani's line relay in such a position as to cause the semaphore to be unlocked and the Block needle to be deflected to 'on line' if Tirutani lifted the covering switch and pressed the button and the plunger in the ordinary way of giving a 'line is clear' ~ acknowledgment. On the arrival of Messrs Winter and

Katpadi says
13.15

and Ross at Trenton: it was found that the Black needle of the instrument connected with Arkonam was at "On line" and the Semaphore was locked at danger, which shows that the Semaphore had been unlocked then lowered and replaced at danger after the above mentioned operations had been performed, and presumably it was raised in the ordinary course by the train itself.

Block Instruments were set up in the Telegraph Engineer's office and so connected with a needle instrument as to demonstrate the action of the Earth currents. It was shown that, if while a current in the direction it was stated by Arkonam to have been flowing on the afternoon in question, were made to flow through the Block Instruments, the hammers of both Block Instruments would be pressing against the bells and that on the current commencing to flow there would be a single beat on the bell. It was further shown that after each pressure of the plunger a beat on the bell of the same instrument would be heard on the release of the plunger, but that little or no effect would be produced on the bell of the distant Block Instrument.

Thus if, while the current was flowing, the signal "Is line clear" were given, practically the same signal would be received back on the bell of the same instrument, but the beats would be intermediate between the successive pressures of the plunger.

It was also shown that if, while a current deflecting the needle to the right was flowing through the Block Instruments, the instrument representing that at Tirutani were manipulated in the ordinary way of acknowledging a 'dine is clear' signal the semaphore connected with it would be unlocked and the needle placed to 'on dine' but that no effect was produced unless the covering switch were raised and the button pressed while giving the acknowledging signal.

With the exception of the President we are of opinion that the station master went through the form of asking 'Is dine clear' and accepted ^{the} beats that he would receive whilst doing so (although these were merely a repetition of his own signals and received while he was himself signalling) as the 'dine clear' signal from Arkonam. Further that on lifting the lever switch and pressing the button and plunges the black train ~~from~~ going needle went to 'on dine' and the semaphore was unlocked.

The irregularities brought to notice in connection with the entries in the Block Register book at Arkonam will be taken notice of by the Divisional Officer.

(Sd.) J. D. Taylor

(Sd.) E. R. Ross

Asst. Traffic Manager

Asst. Traffic Manager
in charge of Division at
the time.

(Sd.) E. E. Dofelure

Ag. Dy. Secy. Supt.

(Sd.) Ross Schisholm

Resident Engineer

7
The President agrees with this opinion
with the exception that he considers that no
trained Block Signaller or Station Master would
be thus misled, but that such a mistake could
only have been made by some unauthorized
person.

(Sd.) J. H. Winter
Telegraph Engineer
President

(True copy)

Wm. J. M. H.
Agent & Manager.

W. J. M. H.

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D. 401 6-3-94
A.M. 172

Conclusion

It is clear from the evidence of the
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(No. III.)

5,000-15389.

No.

D. 401

MADRAS RAILWAY.

172

AGENT AND MANAGER'S OFFICE,

MADRAS, 6th March 1894

From

The Agent and Manager,

M. R. Co.,

To

The Consulting Engineer for Railways.

Sir,

ER
MM 8/3

I have the honour to forward
for your information a copy of the joint
Report regarding the arrival of No. 32
train of 24th February 1894 at Arkonam
from Chintamani without the line being
blocked.

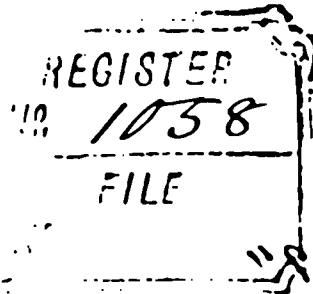
I have the honour to be,

Sir,

Your most obedient servant,

Wm. S. M. D.

Agent & Manager.



1902

Dec 20

Date

To

From

MADRAS RAILWAY

The Agent and Manager,

M. R. Co.

The Consulting Engineer

for Railways.

No.

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Conclusion
by first
Remarks of
first Inspector

It is clear from the evidence of the
Staff at Arcunam that the
"line clear" had not been given
by Arcunam to Tuntani for No 32
train and the staff all stated
their surprise at the arrival of the
train - The Running Staff of the
train were equally surprised, on
being informed, on arrival, by the
Master of Arcunam that their train
had passed over the section from
Tuntani without the line being
blocked - The Driver held the usual
line clear ticket, and both guards
had seen the needle of the Block
Instrument at Tuntani pointing to
"on line" - The Telegraph Engineer
Assistant Traffic Manager & others who
proceeded by the first opportunity to
Tuntani that Station & corroborate
this statement - they also found the
Semaphore locked at danger which
showed that it had been lowered
after certain operation detailed below
had been performed - There is abundant
evidence that the needle of the
Arcunam Instrument pointed to "Clear
line".

The question then arises as to how
it was possible for the needle of the
Arcunam Instrument to point to
"on line clear" while that of the
connected Instrument at Tuntani
pointed to "Train on line" -

It is certain that between 13-00 &
13-30 powerful Earth currents were

prevailing, causing affecting all instruments and causing the block bells to ring irregularly and the Morse needles to deflect. In the Train register book at Aknam a remark to this effect was made at the time — Corroborative reports were received from other Stns also.

It was practically demonstrated to the committee by Mr G. K. Winter the Coo Telegraph Engineer, that under the then existing magnetic condition this irregularity was possible.

The magnetic storm then prevailing was passing in the same direction as that in which a current would be sent from Aknam to Tirutani when giving the line clear signals.

If as there is no reason to doubt Tirutani sent the usual signal asking to line clear 1.2.1-1.1. - his own bell would reproduce the beats almost simultaneously and. If now the Tirutani assuming these beats to be the acknowledgment from Aknam lifted the covering switch and pressed the button & plunger, the action of the Earth current would then unlock the Semaphore & deflect his needle to "on line".

This seems to be the only plausible solution - The "line is clear" signal from the Advance Stn is 2-2-1.1 which would in the ordinary course of affairs be received after an

appreciable interval of time had elapsed after the "line clear" signal had been sent -

I have therefore come to the conclusion that the Stn Master at Tirutani mistook his own echo signal for the reply from Aknam & accordingly went thro' the remaining operations necessary to start the train.

In accepting these signals the Stn Master ~~S. S. Chetty~~ ^{Srinivas} is guilty of gross carelessness - there being no similarity between them and the authorized signals.

The previous character of this man confirms the above conclusion, he having been on several occasions punished for carelessness -

Madras. ... C. W. 8/3/94

ER

In the finding of the committee no blame is attached to the Stn Master or any other person, altho their conclusion is the same as the above.

Remarks by J. M. Winter

The finding of the President Mr. Winter practically confirms Mr. Stowell's opinion but indirectly - There have been in 8 months 4 cases of trains running without line

Clear in the leadless

By.

(1)

On 15th July between Kodur
and Urampad

(2)

On 21st August 93 between
Gooly and Patakattacheru

(3)

On 31st Oct. 93 between
Vanniyambadi and Jalarpet

(4)

On 24 July 94 between
Arconam and Tirutani

As the leadless By. was
the absolute block was on

above the ordinary line clear system & should be practising as per order
it appears that some official
return is required to put a
stop to this sort of
I desire to draw the Dept.
attention to these serious
irregularities - it does
not seem possible that an
accident could have oc-
curred in this ^{hazardous} case but
it is chiefly because of
the frequency of these cases
that the safety of the line
that stringent measures
are necessary. W. J. 10/9/94

JOINT inquiry held at Arkonam on 28th February and 1st March 1894 into alleged
arrival at Arkonam of No. 32 train of 25th February 1894 from Tirutani
without the section having been blocked.

Present.

G. K. Winter, Esq., Telegraph Engineer, President.
C. T. R. Scovell, Esq., Deputy Consulting Engineer for Railways.
J. L. Taylor, Esq., Assistant Traffic Manager.
Ross Chisholm, Esq., Resident Engineer.
E. E. Lefebure, Esq., Acting Deputy Locomotive Superintendent.
E. R. Ross, Esq., Assistant Traffic Manager.

Description.

On Sunday the 25th February 1894 on arrival of the No. 32 train it was
reported by the stationmaster to all concerned that the train had passed over the
section between Tirutani and Arkonam without the line being blocked. The red
needle of the Arkonam instrument was at "cleared line," and it was found, on
arrival of Messrs Winter and Ross at Tirutani, that the "black needle" of the
Arkonam section instrument was at "on line." The semaphore was next examined
and found to be locked at danger and to be in perfect order. The block instrument
was opened and examined and it was found to be in order also, and ultimately testing
signals were exchanged and block working resumed. A preliminary inquiry was
held, the evidence given being practically the same, as far as it went, as that tendered
at the joint inquiry.

Evidence.

The Stationmaster of Arkonam states that, on
hearing the whistle of the No. 32 train out-
side the distant signal and not having heard
the warning bell, he went into the Telegraph
office and found both needles at "cleared line."
The position of the needles is corroborated by
signallers Ritchie and Demonte as well as by
the train clerk Singaram Moodelly, Assistant
Traffic Manager's office.

Signaller Ritchie states that he was at no time
called on the block instrument by Tirutani for
blocking No. 32 train, but that he heard one
beat on the bells of both block instruments at
about 13-15 o'clock and afterwards a trembling
of the hammer against the bell. This is cor-
roborated by signaller Demonte. They also state
that at about the same time the needles of all
speaking instruments were deflected to the right,
showing the existence of earth currents.

These deflections lasted from 13-10 until
13-25. Kátpádi on being asked replied that he
observed deflections on all circuits from 13-10
till 13-18—see copies of replies.

Mr. Andrews states that he had given autho-
rity for the line to be blocked for No. 32 by
signing his name in the register book in the
proper column, but no time is entered against
the signature, and signaller Ritchie denies that
the signature was made before the arrival of
the train.

Signallers Ritchie and Demonte and train clerk
Singaram state that they were in the office
between 13 o'clock and the arrival of the train at
Arkonam, and all say that no exchange of signals
took place between Arkonam and Tirutani
during that time.

The evidence of the stationmaster at Tiru-
tani is to the effect that the line was blocked to

Arkonam for No. 32 train on 25th instant in
the usual manner. He noticed nothing irregu-
lar or unusual in the working of either the
needle or the block instruments on the date in
question before the arrival of the train; but on
the previous day (24th instant) he had some
difficulty in getting Arkonam when blocking the
line for No. 36 train at about 9-26. On the
25th instant also, after the departure of the 18-0
mail from Tirutani, he heard several successive
irregular beats on the block instruments.

He says that he saw the starting semaphore
correctly lowered to caution before the train
started.

His evidence is corroborated by the assistant
stationmaster. Both guards state that they saw
the block needle "on line," and the fact of the
semaphore having been lowered to caution is not
denied by any one.

Mr. Theobald states that, when he arrived at
Tirutani, the black needle of the block instru-
ment connected with Arkonam was "on line."
Mr. Winter and Mr. Ross then pulled lever and
found the semaphore arm locked at danger.
They then went to the semaphore and tested it
and found all correct. Mr. Winter, Mr. Ross
and the Divisional Inspector were present at
the semaphore.

After Messrs. Winter and Ross had left
Tirutani, the effects of earth currents were
observed on all three instruments at Tirutani.

Vencatachellum confirms Theobald's state-
ments above and further states that the block
instrument connected with Arkonam was opened
and examined by himself and Mr. Winter and
it was found that the line relay tongue was in
the normal position and the semaphore relay
tongue in the reverse position.

Finding.

There were strong earth currents affecting all instruments on Saturday the 24th instant and, according to accounts received from Arkonam and confirmed by Kátpádi, the same thing took place between 13-10 and 13-25 o'clock on the 25th. Arkonam says that the needle instruments were deflected to the right between the hours of 13-10 and 13-25 or at the time that the train was at Tirutani. This deflection was caused by a current in the same direction as that which is sent from Arkonam to Tirutani on giving the "line clear" signal, and would put Tirutani's line relay in such a position as to cause the semaphore to be unlocked and the black needle to be deflected to "on line" if Tirutani lifted the covering switch and pressed the button and the plunger in the ordinary way of giving a "line is clear" acknowledgment. On the arrival of Messrs. Winter and Ross at Tirutani it was found that the black needle of the instrument connected with Arkonam was at "on line" and the semaphore was locked at danger, which shows that the semaphore had been unlocked, then lowered and replaced at danger after the abovementioned operations had been performed, and presumably it was raised in the ordinary course by the train itself.

Block instruments were set up in the Telegraph Engineer's office and so connected with a needle instrument as to demonstrate the action of the earth currents. It was shown that if, while a current in the direction it was stated by Arkonam to have been flowing on the afternoon in question were made to flow through the block instruments, the hammers of both block instruments would be pressing against the bells and that on the current commencing to flow there would be a single beat on the bell. It was further shown that, after each pressure of the plunger, a beat on the bell of the same instrument would be heard on the release of the plunger, but that little or no effect would be produced on the bell of the distant block instrument.

Thus if, while the current were flowing, the signal "is line clear" were given, practically the same signal would be received back on the bell of the same instrument, but the beats would be intermediate between the successive pressures of the plunger.

It was also shown that if, while a current deflecting the needle to the right was flowing through the block instruments, the instrument representing that at Tirutani were manipulated in the ordinary way of acknowledging a "line is clear" signal, the semaphore connected with it would be unlocked and the needle placed to "on line," but that no effect was produced unless the covering switch were raised and the button pressed while giving the acknowledging signal.

With the exception of the President, we are of opinion that the stationmaster went through the form of asking "is line clear" and accepted the beats that he would receive whilst doing so (although these were merely a repetition of his own signals and received while he was himself signalling) as the "line clear" signal from Arkonam. Further, that on lifting the cover switch and pressing the button and plunger the black train-going needle went to "on line" and the semaphore was unlocked.

The irregularities brought to notice in connection with the entries in the block register book at Arkonam will be taken notice of by the Divisional officer.

(Signed) J. L. TAYLOR,
Asst. Traffic Manager.

(") E. E. LEFEBURE,
Ag. Dy. Loco. Superintendent.

(") ROSS CHISHOLM,
Resident Engineer.

(") E. R. ROSS,
Asst. Traffic Manager, in charge
of Division at the time.

The President agrees with this opinion with the exception that he considers that no trained block signaller or stationmaster would be thus misled, but that such a mistake could only have been made by some unauthorized person.

(Signed) G. K. WINTER,
Telegraph Engineer, President.

Remarks of Government Inspector of Railways.

It is clear from the evidence of the station staff at Arkonam that the "line clear" had not been given by Arkonam to Tirutani for No. 32 train, and the staff all stated their surprise at the arrival of the train. The running staff of the train were equally surprised on being informed, on arrival, by the stationmaster of Arkonam that their train had passed over the section from Tirutani without the line being blocked. The driver held the usual line clear ticket and both guards had seen the needle of the block instrument at Tirutani pointing to "on line." The Telegraph Engineer, Assistant Traffic Manager and others, who proceeded by the first opportunity to that station, corroborate this statement; they also found the semaphore *locked* at danger which showed that it had been lowered after certain operations detailed below had been performed. There is abundant evidence that the needle of the Arkonam instrument pointed to "cleared line."

The question then arises as to how it was possible for the needle of the Arkonam instrument to point to "line clear," while that of the connected instrument at Tirutani pointed to "train on line."

It is certain that between 13-00 and 13-30 powerful earth currents were prevalent, affecting all instruments and causing the block bells to ring irregularly and the Morse needles to deflect. In the train register book at Arkonam a remark to this effect was made at the time: Corroborative reports were received from other stations also.

It was practically demonstrated to the committee by Mr. G. K. Winter, the Company's Telegraph Engineer, that under the then existing magnetic conditions this irregularity was possible.

The magnetic storm then prevailing was passing in the same direction as that in which a current would be sent from Arkonam to Tirutani when giving the line clear signals.

If, as there is no reason to doubt, Tirutani sent the usual signal asking is line clear 1, 2, 1-1, 1, - his own bell would reproduce the beats almost simultaneously. If now Tirutani, assuming these beats to be the acknowledgment from Arkonam, lifted the covering switch and pressed the button and plunger, the action of the earth current, would then unlock the semaphore and deflect his needle to "on line."

This seems to be the only plausible solution. The "line is clear" signal from the advance station is 2-2-1-1 which would in the ordinary course of affairs be received after an appreciable interval of time had elapsed after the "is line clear" signal had been sent.

I have therefore come to the conclusion that the stationmaster at Tirutani mistook his own signal "echo" for the reply from Arkonam and accordingly went through the remaining operations necessary to start the train.

In accepting these signals the stationmaster, Tirutani, is guilty of gross carelessness, there being no similarity between them and the authorised signals.

The previous character of this man confirms the above conclusion, he having been on several occasions punished for carelessness.

In the finding of the committee no blame is attached to the stationmaster or any other person, although their conclusion is the same as the above.

MADRAS,
8th March 1894.

(Signed) C. T. R. SCOVELL,
Government Inspector of Railways.

Remarks by Senior Government Inspector.

The finding of the President Mr. Winter practically confirms Mr. Scovell's opinion but indirectly. There have been in 8 months 4 cases of trains running without line clear on the Madras Railway—

- (1) On 15th July 1893 between Kódúrd and Urampádh.
- (2) On 21st August 1893 between Gooty and Patakattacheru.
- (3) On 31st October 1893 between Vániyambádi and Jalarpet.
- (4) On 24th February 1894 between Arkonam and Tirutani.

As the Madras Railway has the absolute block over and above the ordinary line clear system, it should be practically safeguarded against trains running without line clear. I desire to draw the Agent's attention to these 4 serious irregularities. It does not seem possible that an accident could have occurred in this particular case, but it is chiefly because of the frequency of these cases that stringent measures are necessary.

MADRAS, CHEPÁK,
10th March 1894.

(Signed) F. R. UPCOTT,
Senior Govt. Inspector for Railways.

To the train

Form No. 1.

PUBLIC WORKS DEPARTMENT.

OFFICE OF CONSULTING ENGINEER FOR RAILWAYS,

Madras, 29th March 1894.

Report of Jt. Engineer held
at Arkonam on 28.2.94 and
1st March 1894 into the
alleged derail of at Arkonam
of No. 32 train of 15 July 94
from Tirutani, without the
line being blocked.

No. 15

SUBMITTED. For the information of Government.

CTM. 28th/₃
over.

Genl. 193 R 29-March 1894.

Recorded.

2. The serious attention
of the Agent's Manager
Madras Rly should be
drawn to the frequent
failures of block working
on the Madras Rly.

cases of this nature
are of frequent occurrence
and the M.Ry. the attention
of the Agent and in answer
should be drawn to it
a view to the issue of
stringent orders to the Staff.

7/11/94

2. The Agent's Manager, Madras Rly.

A
 No. 173 R 29 - March 1894.