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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W DEPARTMENT

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Dated <u>30 - 8 - 1878</u> -197-	

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V.S.M

Archives I-10,006-19-4-79

3453W
1

GOVERNMENT OF MADRAS
PUBLIC WORKS DEPARTMENT.

30th August 1878, No 3,453 W.

Buildings and Roads.
Civil Works

Read again the following —

Proceedings of the Madras Government in the Public Works Department, dated
9th May 1878, No 2 098 W

Read also the following paper —

No 340 From Major H SMALLLY, R E, District Engineer, South Canara,
to the Chief Engineer, Public Works Department, dated Mangalore, 5th
August 1878, No 49

With reference to G O, No 2,098 W, of the 9th May 1878, I have the honor to
inform you that as the late District Engineer, Mr Pringle, has not left on record his
notes on the effects of the lightning discharge at this station on the 28th April 1878,
I have obtained a report on the subject from the Mangalore Divisional Officer, which
is herewith submitted (in original), with plans of the place-of-arms and tent godown
therein referred to.

Report on the Thunderstorm of the 28th April 1878

The storm occurred at Mangalore on the night of the 28th April (Sunday), it commenced
as nearly as possible at 9 o'clock and reached its worst at about 10, the rain being very heavy.
The accident is supposed to have taken place shortly after 10, the thunder at this time being
very close, between 10-20 and 10-30 there was a terrific peal, the flash and report being
simultaneous.

The lightning was very vivid, lighting up the entire maidan, the thunder was a sharp, clear,
well-defined sound, resembling the report of a rifle many times intensified.

This peal was followed at a short interval by two lesser peals coming very close one on
the other. The first-mentioned flash is supposed to have struck the place-of-arms, while the last
two apparently took effect on the tent godown.

The Place-of-Arms—This is a long, low building, lying nearly north and south, the
roof being hipped. It was struck on its northern hip, the flash separating and reaching the
ground by three channels.

(1) The fluid ran down the eastern rafter of the couple, shivering it in its course, entered
the side wall at A (*vide* plan and longitudinal section), and passed down through it till it
reached the accoutrement pegs, leaving the wall it now ran along these, in many cases passing
through pouches filled with loaded cartridges, but without exploding them; close to the window
(*vide* plan and longitudinal section) it again entered the wall, passing directly through it, struck
and killed a cow on the opposite side, and discharged into the ground immediately at the foot of
the wall. The fluid in this case took a southerly direction.

(2) The fluid followed a very similar course to that already described; it ran down the
western rafter of the couple, shivering it up, entered the side wall at B (*vide* plan), and passed
down through it to the accoutrements, ran along these, this time in a northerly direction, till it
reached the cross wall XY, entering this at C (*vide* plan and cross section) almost on a level with
the accoutrements (i.e., about 4 feet up the wall), it passed through downwards re-appearing on
the opposite side at point D (*vide* cross section) about 1½ feet up the wall. It then turned at
right angles, and passing through wall MN (*vide* plan) ran along the iron work of the door,
whence it passed to the ground, entering close to the door step.

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As passing through wall XY it is supposed that the fluid again separated, one portion taking the route above described, the other crossing the road to wall MO (vide plan) passed through the very low down and entered the ground outside.

The course in this case is not easy to follow, the road is quite on the level and the road is not high, and at the time the house was burning these circumstances were regarded as the wall MO, as no instruments were injured, it is probable that these were not killed, the track of the fluid on the roof of wall MO was only slightly visible, the fluid being in the position of the water very low down close to the ground, on the inside, however, no satisfactory trace could be detected.

13. The further taken by the fluid was a large one of the gable roofers in the roof of wall XY, the gable roofers being from the ridge to the eaves, a brand was in the gable roofers. It is not clear if the wall XY at 1 ft. 6 in. from the ridge to the eaves, the gable roofers were not very clear but it is clear that the fluid was in the wall XY close to the roof line, from G, and passed on to the iron work of the door, and thence to the ground, where it entered the ground.

The door in wall B is not copper sheathed, and no connection exists between its iron work and the conductor. The level of the ridge of the place-of-arms is higher than the upper termination of the conductor, while it (the point of the conductor) may be slightly but very slightly higher than the ridge of the tower godown.

The door in wall B is not copper sheathed, and no connection exists between its iron work and the conductor. The level of the ridge of the place-of-arms is higher than the upper termination of the conductor, while it (the point of the conductor) may be slightly but very slightly higher than the ridge of the tower godown.

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The door in wall B is not copper sheathed, and no connection exists between its iron work and the conductor. The level of the ridge of the place-of-arms is higher than the upper termination of the conductor, while it (the point of the conductor) may be slightly but very slightly higher than the ridge of the tower godown.

20 feet from ground level to the ridge, stands higher than the magazine, the latter (17 feet from ground level to ridge) is lower in situation, but its ridge is very nearly on the same level as that of the magazine. Distance from place-of-arms to magazine 218 feet. Distance from tent godown to magazine 191 feet. The magazine is provided with a conductor, this conductor is of solid copper, being a bar of 3 1/4 inches in circumference. It runs along the whole length of the ridge of the building, from end to end.

* The roof actually extends at either extremity of the building some distance beyond the magazine, forming a kind of verandah. In the report these projections of the roof have been ignored.

At the end (A) the bar runs down the face of the gable wall, and is carried to a distance of 2 feet under the ground, where the rod terminates. The earth connection is made by strip copper 3 inches wide and 1/4 inch thick and 26 feet long. This sheet copper is soldered to the rod at its ground termination, and carried along at right angles to wall A for a distance of 26 feet and at a depth under the surface of the ground of 2 feet, the whole length of 26 feet being buried in a bed of charcoal, with a cross section 1 square foot, the soil is latite, and the earth connection is in dry ground.

Gable B on this side. The copper rod terminates with the ridge, and copper sheeting of the same dimensions as already mentioned, soldered to the extremity of the rod, runs down the face of the gable wall B and into the ground to a depth of 1 foot below the surface, it then runs at right angles to wall B to a distance of 25 feet clear of the building, the earth connection being in every way similar to that for the gable wall A.

The upright, which is also a solid rod of 3 1/4 inches circumference, is 5 feet in height and is supplied with one point, it is placed at a distance of about 1 foot from the apex of gable (A).

The magazine is provided with two doors, the one in the gable wall (A) is copper sheathed, and the connection is made with the conductor by strip copper nailed to the door and nailed round the rod.

The door in wall B is not copper sheathed, and no connection exists between its iron work and the conductor. The level of the ridge of the place-of-arms is higher than the upper termination of the conductor, while it (the point of the conductor) may be slightly but very slightly higher than the ridge of the tower godown.

Question 7—Yes, as far as I am aware the discharge formed part of an ordinary thunder-storm.

Question 8—The storm lasted in force for some four or five hours, beginning at 9 p.m. and continuing till 1 a.m., after which it gradually died away. The rainfall during the night was 5 inches.

(Signed) J P DAVIDSON, Assistant Engineer.

MANGALORE, 1st August 1878.

No. 341 ORDER THEREON, 30th August 1878, No 3,453 W. ORDERED to be communicated to the Government of India (Here enter No 3,454 W, dated 30th August 1878)

(True Extract) (Signed) E. A FOORD, Colonel, R E, Secretary to Govt, P.W.D.

To the District Engineer, South Canara.

Exd A F Goodall
Spore Copies

3454 W
#3

PUBLIC WORKS DEPARTMENT.

Buildings and Roads
Civil Works

No 3,451 W.

No 342

FROM

THE SECRETARY TO THE GOVERNMENT OF MADRAS,
Public Works Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Public Works Department

SIR.—In the circular of the Government of India, No 32, dated 1st June 1876, it is requested that any marked cases that may be observed of injury caused by lightning discharge may be communicated. I am accordingly to forward the accompanying papers containing observations in connection with a case which occurred at Mangalore on the night of the 28th April, by which two military buildings, viz, the place of-arms and the tent godown, were damaged and a sentry killed.

I have the honor to be,

Sir,

Your most obedient servant,

Colonel, R E,
Secretary to Govt, P W.D.

OCTACAMUND,
30th August 1878.

Exd A F Goodall
2 para Copies

W. H. 4 W
H

RECEIVED
10/10/78
10/10/78

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District Engineer's Office
Mangalore 10/10/78
From The District Engineer
South Canara
To The Chief Engineer D. W. M.
Madras.

With reference to G. O. No. 20983
of the 15th May 1878 I have the honor to inform
you that as the late District Engineer Mr. P. R. P.
has not left any record his notes on the effects
of the lightning discharge at this station on the
28th April 1878, I have obtained a report on the
subject from the Mangalore Divisional
Officer, which is herewith submitted in original
with plans of the place of occurrence and of the
therein referred to.

I have the honor to be,
Sir,
Your most Obedt Servt,
H. M. M.
Major D. W. M.
District Engineer
South Canara

The Chief Engineer
U.S. Frigate

Dated 5 August 1878

To 49

Rich (1878)

Forwarding a report from
Mangalore District Officer
on 11/3/78

Report on the Thunderstorm
of the 28th April 1878

The storm occurred at
Mangalore on the night of
the 28th April (Sunday) - it
commenced as nearly as
possible at 9 o'clock, and
reached its worst at about
ten; the rain being very
heavy. The accident is sup-
posed to have taken place
shortly after ten. The thunder
at this time being very
close, between 10.20 and 10.30
there was a terrific peal,
the flash and report being
simultaneous.

The lightning was
very vivid, lighting up the
entire mountain. The thunder
was a sharp, clear, well
defined sound, resembling
the report of a rifle many
times intensified.

The peal was felt

blowed at a short interval
by two lesser peaks coming
very close, one on the other.
The first mentioned flash
is supposed to have struck
the Place of Arms, while
the last two apparently took
effect on the West side.
Place of Arms.

The ship was low
hulled, lying on her side,
North end down, the roof
being tipped. It was struck
on its Northern hip, the flash
separating and reaching the
ground by three channels.
(1) The fluid ran down the
Eastern rafters of the cap, shivering
it in its course, entered
the side wall at (A)
(side plan and ^{longitudinal section} ~~cross-section~~), and passed
down through it, till it
reached the accommodation
deck. Leaving the wall it
now ran along there, in
many cases passing through

31534
6
pouches filled with loaded
cannonballs, but without
exploding them; close to the
windward (side plan and
~~cross-section~~ ^{longitudinal section})
it soon entered the wall,
passing directly through
it, struck and killed a
cow on the opposite side
and discharged into the
ground immediately at
the foot of the wall. The
fluid in this case took a
southerly direction.
(2) The fluid followed a
very similar course to that
already described; it ran
down the Western rafter
of the cap, shivering it
up, entered the side wall
at B (side plan and ~~cross-section~~ ^{longitudinal section}) and
passed down through it
to the accommodation deck, ran
along there, this time in a
Northerly direction, till
it reached the roof wall
X. Y.

2. Entering from at C
(side plan) and ^{east window} ~~passing~~
through (H) almost
on a level with the pe-
-riment, i.e. about
4 feet up the wall, it pas-
-sed through doorways
re-appearing on the opposite
side at point D (side
section plan) ~~about 10 ft~~
about 10 ft up the wall.
It then turned at right angles
and passing through wall
H. (side plan) re-appeared
the main work of the place,
whence it passed to the
ground, entering close to
the door.

After passing through
wall E. of it is supposed
that the fluid was re-
-ported, some portion taking
the route above described,
the other passing the room
to wall M. O. (side plan).
passed through the north
door and entered the

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1

ground outside.
The course in this case
is not easy to follow. the
room in question being the
Pond. Instrument room; and
at the time the paper was
-taining these instruments
were ranged along the wall
M. O. - as no instruments
were injured, it is pre-
-sumed that these were
untouched. the track of
the fluid on the outside
of wall M. O. was clearly
defined by the broken
mortar ^{was} and the
position of this was very
low, down close to the
ground; on the inside, how-
-ever, no satisfactory trace
could be discovered.

(3) The third route taken
by the fluid was along one
of the back papers resting
on the end wall E. of it
apparently

apparently jumped from
the top to the rafters, and
ran down it, without doing
it any material injury.
It then entered the wall
C. of at B. side (on section).
close to the rafters passed
down this and appeared
at point G. about 1 foot
above the accoutrements.
Its course among these is
not very clear, but it left
them to again enter the
wall C. of. close to the
door frame, point G, and
passed on to the iron work
of the door, and thence to
the ground which it sur-
rounded close to the door.

This door is an ordinary
bottom door with large
iron hinges about 1 foot
in length. These hinges were
apparently the attraction
in the two places in which
the fluid passed to the

ground by means of the
door.

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The cow, which was
killed was very much dis-
tended, and blown out, hav-
ing the same appearance
as a drowned animal,
otherwise as far as I can
ascertain it had sustained
no injury.

Latent is apparently
a good conductor, the walls
having sustained no damage
beyond that done to the
structure.

The Tent below.

The tent below is
a small cable-roofed build-
ing. This was struck
twice very intelligible
A & B. this being the per-
fect of the two lesser
peaks, already mentioned
as having formed the
first. The building is
provided

provided with a verandah;
it has two iron banded
windows, one in either gable
wall, also two zinc venti-
lators, one at the foot of
either gable wall. During
the storm the butt down
putty, and the salting all
putty had broken chinks
in the verandah taking
up their positions at the
opposite ends.

The flash which struck
gable A. passed to the ground
by three routes viz: -

Route (1). The fluid ran
down through the gable
wall A. on the inside, pass-
ed on to the side wall
D, entered the road side
wall, passed to the ground
close to the corner of the
building on the outside,
leaving the wall D. at a
height of 1 foot from the
ground at the point O.

Consider

3453¹²
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(vide elevation).
Route (2). The fluid ran
down the gable wall A,
thence it passed to wall
C, ran down this some
distance, returned to the
wall A. and passed to the
ground close to the zinc
ventilator at point P.

(vide elevation).
Route (3). The fluid in this
case ran down the end
rafter to wall C, thence
it passed to the verandah
rafter, and from this to
the end pillar of verandah,
down which it passed
to the ground (vide ele-
vation). In passing along
the verandah rafter, a
portion of the electric fluid
attracted by the payment
of the party, who was
standing at "order up"
immediately under the
rafter

after, ran down the bayonet
= net, and along the mistle
tooth of the rifle, splintering
the stock, and killing the
sentry. The point of the
bayonet in this case was
very much forced.

It is possible that the
flame ran down directly to
the zinc ventilator, along
the gable wall A, but this
was not clear.

The flash which struck
gable B passed to the ground
down the gable wall B. by
two routes, in one case en-
tering the ground on the
interior close to the venti-
lator, and in the other, near
the foot of the wall B, close
to its junction with wall D.
(Side Points P' and Q' re-
spectively on ^{Side A} and ^{Side B} respectively).
On the other route was also taken
by the flame in this case.

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viz: down wall B, thence on
to wall C, which it entered
half way up, about 18" from
the intersection of B & C - from
this it apparently returned
to wall B, and passed to the
ground in the neighbour-
hood of the ventilator.

The sentry standing at
this end of the verandah
was knocked down and
killed - whether this was
the effect of the original
stroke, or due to the portion
of flame which entered
wall C, without passing
through, it is difficult to
say.

The latelite again acted
as a very poor conductor
the breaking up of the plaster
being the chief damage.

80. 11. 1511 41
17 June 1876

Question (1) The point of
the bayonet of the man
who

who was killed was very much fired and blunted. The pouches through which the discharge passed were pierced, the holes being small and cleanly made and the leather was slightly charred. The metal work on the belts was blackened.

Question 6. The Powder Magazine, a low gable roofed building, 12 feet from ground level to ridge lies between the Place d'Armes and Tent for down. The former building, which is 20 feet from ground level to the ridge, stands higher than the Magazine, the latter (17 feet from ground level to ridge) is lower in situation, but its ridge is very nearly on the same level as that of the Magazine. Distance from Place d'Armes to Magazine - 213 feet.

x The roof actually extends at either extremity of the building some distance beyond the Magazine, forming a kind of verandah - In this report these projections of the roof have been ignored -

Distance from Tent for down to Magazine - 191 feet. The Magazine is provided with a conductor - this conductor is of solid copper being a bar of 5 1/2 inches in circumference, it runs along the whole length of the ridge of the building, from end to end. x At the end (A) the bar runs down the face of the gable wall, pierces a window to a distance of 2 feet under the ground, where the rod terminates. The earth connection is made by strip copper 3" wide and 1/8" thick and 26 feet long - this sheet copper is soldered to the rod at its ground termination, and carried along at right angles to wall A. for a distance of 26 feet, and at a depth under the surface of the ground

of 2 feet, the whole length
of 20 feet being lined in
with of charcoal, with
a cross section 1 square
foot, the soil is laterite,
and the earth connection
is in dry ground.

Gable B on this side - the
copper rod terminates with
the ridge, and copper sheeting
of the same dimensions as
already mentioned, solder-
ed to the extremity of the
rod, runs down the face
of the gable wall (B) and
into the ground to a depth
of 1 foot below the surface.
It then runs at right angles
to wall B to a distance of
20 feet clear of the building.
The earth connection being
in every way similar to
that for the gable wall A.

The upright, which is
also a solid rod of $3\frac{1}{2}$
inches circumference, is

5 feet in height and is cop-
-plined with one point. It is
placed at a distance of about
1 foot from the apex of gable
A.

The Magazine is provi-
-ded with two doors, the
one in the gable wall (A) is
copper sheeted and connection
is made with the conductor
by strip copper nailed to the
door and nailed round
the rod.

The door in wall B is
not copper sheeted, and no
connection exists between
its iron work and the con-
-ductor. The level of the
ridge of the Place d'Armes
is higher than the upper
termination of the con-
-ductor, while it (the point
of the conductor) may be
slightly but very slightly
higher than the ridge
of

Dec 7-12-18

it is requested that any
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 observed of injury caused by
 lightning discharge may
 be communicated. I am
 accordingly, to forward the
 accompanying papers con-
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 nection, with a case which
 occurred at Mangalore
 on the night of the 25th April
 by which two Military
 buildings, viz the place of
 arms and the tent godown,
 were damaged

11th
 20th 1878

signed / signed at Calcutta on the
 18-9-78
 signed / signed at Madras on the
 17-9-78 in the life
 of J. H. S. S.

J. H. S. S.

8919

Colt. of (1870) Madras

PUBLIC WORKS

To

N. I. L. L. L.

And

And

W. H. L. L. L.

And

And

At 11, 30 Aug 1870, 20 3453 10
3454 10

Nos.

W. H. L. L. L.

Place of Arms & Sub-Station

Marginalia

Report of the lightning
discharge into ——— which
to be forwarded to the Genl.

Forwarding the report of lightning
discharge in the Place of
arms & Sub-Station
Marginalia