

BACK PAPERS.

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

FURTHER PAPERS.

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

LOCAL AND MUNICIPAL DEPARTMENT.

Papers to be read in proceedings:—

Again G.O., No. dated 189 ,
 Again G.O., No. dated 189 ,
 Current No. 4230 M of 1897, dated 6th Dec 1897, from the P.W. Departt. Ry. Branch
 " " 4340 M " 1897, " 16 Dec 1897, " " Sanitary Comm.
 " " " 189 , " , "

H.M.
MiscORDER. n^o 8 m Dec 17 4. 1-98

The Government agrees with the
 Sanitary Commissioner in considering
 that no change is desirable at pre-
 sent in the mode of disinfection of
 railway carriages.

30/12/97

P.A.
 19/12/97

HT
 18 12 97

To The Public Works Departt. Ry. Branch
 " Sanitary Commissioner.
 DWP. 7/1/98

CURRENT No. 4230M

Plague

TO BE RETURNED
WITH REPLY

From The P. W. Department
Railway Branch

No. 1290 of 9-12-97
Order

Referred to the Sanitary Com-
missioner for remarks.

No. 44 R. M.

V.M.
9/12/97

H. Trevelyan
Ag. Secretary to Government.

Dated 6th December 1897.
Received 8-12-1897 DEC. 1897
Registered 8-12-1897
Enclosures 2.
Spare copies

SUBJECT.

Transferring to the Local and
Municipal Department letter from
the Agents, South Indian Rail-
way re: the disinfection of rail-
way carriages.

The Sanitary Commissioner.

G.O.	No.	Department.	Date.
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FURTHER PAPERS.

G.O.	No.	Department.	Date.

No. 1127 Plague
 South Indian Railway Co., Ltd.,
 AGENT'S OFFICE,
 TRICHINOPOLY, 26th Nov 1897.
 From The AGENT,
 SOUTH INDIAN RAILWAY,
 To The CONSULTING ENGINEER FOR RAILWAYS,
 MADRAS.

*901066W
3-5-97*

Sir,
 With reference to Government Order N^o 299 R. dated 30th April 1897, I have the honor to forward for the consideration of Government a copy of letter N^o A/176 dated 22nd November 1897 from the Superintending Physician of this Railway. The disinfection of carriages by steam offers such facilities in practical application in addition to the advantages of cheapness, rapidity, and thoroughness of penetration, that if effective it should, I consider, be permitted. Dr Oliver's suggestion appears to me so valuable that I am not delaying this reference for the further particulars he promises.

ER.
 2 copies sent to the & Sanitary Commission the Surgeon General
 CMH 30 Nov 97
 But what about you?
 7/11 30/11/97

1 Enclosure

Mald

Copys to Surgeon General
 CMH 30 Nov

I have the honor to be
 Sir
 Your most obedient servant
 W. de Measuries
 for Agent *Captain, R.E.*

PLAQUE

Copy of a letter No.A/176 dated 22nd November 1897,
from the Superintending Physician, to the Agent, South Indian
Railway.

Disinfection of Railway Carriages.

1. The disinfection of railway Carriages has ever been a most difficult and unsatisfactory process. It is rendered so not only by the size and peculiarities and irregularities, of the surface of the area to be disinfected, but also by the want of appliances to bring into that intimate contact necessary for the purpose, the germicide employed and the disease-germs sought to be destroyed. With the only means at present available to us, chemicals of more or less potency, are abundantly, even wastefully applied to the interior of the Carriage; but a little scrutiny, and some very simple experiments, will show that infective micro-organisms can nevertheless escape destruction.

The instructions contained in a letter No. 349 R.T. of 21st April 1897, embodied in G.O. No. 299 R dated 30th April 1897, founded as they evidently are on the suggestions of the last Venice Conference, appear to ignore these considerations regarding current practice in the disinfection of Railway Carriages. But as after some practical experience in these methods, I cannot put any scientific faith in them, I should like to be instructed how far I am bound to consider what is laid down in the G.O. referred to as orders not to be violated. The employment of steam for the purposes of disinfection is so much more satisfactory, and to us railway workers, so easy of application that I venture to state that the use of solutions containing soap, Carbolic acid and Mercuric Chloride, is unwarrantable.

2. The methods in use now may be divided into two Classes:- (a) fumigation with sulphur and (b) the application of various known bactericides in solution with water. To discuss these seriatim would prolong this letter to a wearisome length. So I will observe briefly and generally.

1. Sulphur is totally untrustworthy. The difficulties in the way of volatilizing it are considerable. The S.O₂ gas when generated is mostly wasted. For in an anhydrous state it is not antiseptic. And the moisture left on the walls of the Carriage by the most liberal douche cannot be about 2 litres, capable of absorbing (and forming the germicide Sulphurous acid H₂S O₃) only some 100

*Flag K
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*to be
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not
return
yet.*

P.S.

Dated
Received

No.

189

Enclosure.

From
The Agent,
South Indian Railway,
Trichinopoly.
To
The Consulting Engineer for
Railways,
Madras.

1/28 Nov 1897

out of 1000 litres
litres or more of gas intended to be generated by the
quantity of Sulphur burnt in a carriage. Then, lastly,
the gas possessing very feeble powers of penetration, the
numerous crevices between the Boards of a Carriage and the
various recesses (two situations par excellence, the lur-
king places of micro-organisms) are unattacked. Silver
Coin covered with a single layer of Cotton rag, and left
on the floor and seats, and thin silver wire inserted into
the crevices, are found to be untarnished in a carriage fumi-
gated with sulphur.

ii The application of solutions. The argument against
Sulphur concerning its failure after the generation of
the gas $S.O_2$, holds also against the use of solutions.
Even with the most powerful douching it is almost impos-
sible to wash out or even saturate the dust in the crevices
between the boards. And mercuric Chloride solution may
thus come to be applied to micro-organisms in doses not
only too small to hurt them, but even weak enough to favor
their growth.

The strength ordered in the G.O. previously referred
to will not certainly kill spores. For this mercuric chlo-
ride solution should not be weaker than 1 in 500 and not
1 in 1000 as ordered.

And 1 in 500 or even 1 in 1000 mercuric chloride solu-
tion, it is not safe to use largely in carriages which carry
passengers, the bulk of whom go barefooted and are lightly
clad.

3. The germicidal action of steam requires no demonstration.
And its wonderful powers of penetration make it the most sui-
table disinfectant for railway carriages. I am at a loss to
know why no notice is taken of this means of disinfection for
railway carriages. Doubtless the controversy as to the relative
merits of steam under high pressure and steam ^{at} atmospheric pres-
sure has had to do with this neglect. But Esmarch, Max Gruber,
and Watz set this matter at rest 9 years ago (*Gesundheits-*
Ingenieur 1888 pp 674 and 697 and *central blatt fur Bacterio-*
logic and Parasitenkunde Vol iii pp 638 &c). Steam at atmospheric
pressure and at $212^{\circ}F$ and over will rapidly kill organisms.

Our Engines work at about 120 lbs pressure, and at the end
of a 20 feet of one inch pipe connected with the Injector steam
cock stand it is possible to obtain steam issuing with great
force at a temperature varying between $300^{\circ}F$ and $320^{\circ}F$. The
free end of the pipe run into a closed carriage, very quickly
inundates the interior of the Carriage with steam not under
 $216^{\circ}F$. In experiments I found temperatures registered from
 $216^{\circ}F$ to $228^{\circ}F$ after 7 minutes steaming, with a properly insu-
lated pipe and care taken to block all communications between

(3)

the exterior and interior of the carriage it is possible to get somewhat higher temperatures. But this I consider unnecessary. A temperature not lower than 212°F is all that is necessary. And according to the researches of Esmarch, Koch, and others, super-heated steam is of doubtful value as a germicide.

In the disinfection of a Carriage with steam, I would recommend that after connection with the boiler of an Engine in the way previously referred to, the steam should be run into the Carriage for three minutes and then shut off. After the lapse of a minute or so, the interior is again inundated with floods of steam for three periods of ten minutes each. It is thus possible to complete the disinfection of a carriage from start to finish in well under an hour. A period which compares favourably with the 48 hours or more taken now.

As this letter has already been sufficiently prolonged, I will in a further communication refer to the matter giving other details. But I trust I have said enough here to give a general idea of the process and its claims for acceptance with us in this railway.

Agent's Office,
Trichinopoly,
26th November 1897.

(True copy)

M. De Mesurier
for Agent.

M. D.

Plague
R. Form No. 11.

No. 44 R.M.

Government of Madras.

4230h

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

MEMORANDUM.

Dated Madras, 6th December 1897.

Letter from the Agent, South Indian
Railway, dated 26th November 1897, ^{N^o 1127.} with
enclosure.

Transferred to the Local and Municipal
Department.

M. S. S. S.
Offg. Under Secretary

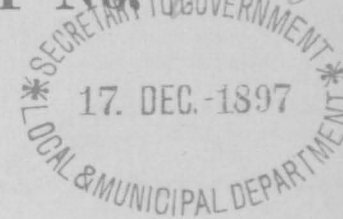
ENC. NO. 1 TO E. R. S. C. NO. 5219 OF 1897
LETTER NO. 1127 D 26. 11. 97
FROM A

2
4230h of 1897

1897

Plague
Local & Munl. (1897) Department.

CURRENT No. *4340/M*



Order.

From

*The Sanitary Commission
for Madras.*

No. 2628
S

Dated *16th December 1897.*

Received *17-12-1897*

Registered *17-12-1897*

Enclosures *C. No 4230/M retd.*

Spare copies

SUBJECT.

*Submitting remarks with ref:
to endorsement of Government
No 1290 dated 9th December 1897
on letter from the Agent South
Indian Railway regarding the
disinfection of railway carriages.*

*S.C. (Sanitary)
11/12/97*

Ar/12/97

BACK PAPERS.

G.O.	No.	Department.	Date.
So	1035	Wh	1-5-87
So	1066	Wh	3-5-87

FURTHER PAPERS.

G.O.	No.	Department.	Date.

2,250-1-1-97.

No.

2628

OFFICE OF SANITARY COMMISSIONER,

Fort St. George, 16th Decr 1887.

From

SURGEON-LIEUT.-COL. W. G. KING, M.B., C.M., D.P.H.,

SANITARY COMMISSIONER FOR MADRAS,

To

The

Secretary to Government
Local Municipal Deptt.

Enclosure.

Sir,

on Cur No 4230 M

With reference to your endorsement N^o 1290 dated 9th instant, I have the honor to state that the use of steam for disinfecting cattle trucks (when spore bearing bacteria have to be dealt with) is by no means new. An account of this method, and of the arrangement necessary for applying it, will be found at page 316 of the British Medical Journal for 1885. The question of killing spores referred to by the Superintending Physician need not be considered, as the germs likely to be dealt with, namely, Cholera and plague, are sporeless - so far as is known. The further plea as to the want

want of efficacy of perchloride solution, is based upon possible want of care in method of application. As the method of use is within the control of the Superintending Physician, and such difficulties as exist resolve themselves into questions of the most common care and precaution, I see no reason, in the face of overwhelming evidence to the opposite, to believe that if correctly applied, perchloride of mercury solution is otherwise than highly efficient. In respect to the suggestion of danger to passengers from the perchloride solution, I would point out that although it has been held salivation has been so produced in a case placed on record in a dwelling (where prolonged not temporary residence, as in the case of carriages might be presupposed) it is also recorded that no less ^{than} 35,000 dwelling houses were so disinfected without evil results. Further

Further the solution up to ~~100~~ ¹⁰ strength is freely used as a disinfectant of wounds in surgery, and supplies for the destruction of sporeless bacteria. Even this mere possibility might be safely got rid of, by seeing that after the lapse of thirty minutes the whole carriage to which the disinfecting solution has been applied is swabbed with plain water or, better still, with soft soap and water.

2. Now, granting that by an application of perchloride solution, sporeless bacteria can be killed within thirty minutes, that is to say, if both steam and the solution are effective within a convenient period of time, it is necessary to ascertain what advantage the former possesses over the latter. It is held that steam is cheaper. This may be so, but as the actual cost of the steam is not stated it is impossible to form any just conclusion. Personally, I should think that if the cost of steam were correctly estimated, its employment in this

this way will not bear comparison with that for the very small amount of the cheap bazaar chemicals required. A further claim is its greater "penetration". This term is apparently used to imply the searching of cracks and crevices. It is more generally applied to the power of steam entering permeable fabrics and it is precisely in this connection that the real necessity for the use of steam appears. The surfaces presented for disinfection in railway carriages are of a hard and usually smooth description and whilst doubtless cracks and crevices do exist, the whole surface of the interior is such as to enable complete disinfection to be effected with less care than in the case of an ordinary room. Against the claim of better penetration must be balanced the fact ^{that} even in well constructed machines, the difficulty of obtaining an uniform temperature in all parts of the machine is the greatest difficulty.

difficultly in practice and I should think in a large and imperfectly shut structure like a carriage, this difficulty would be more pronounced. Hence it need not be said in the presence of a temperature variable in degree and duration in different parts of the carriage that disinfection-bearing germs would be under risk of being unaffected.

3. The economy as to time is also not apparent. After treatment with perchloride solution and subsequent washing and swabbing, delay in use would be requisite not for 48 hours as suggested by the Superintending Physician, but till the wood work was dry, a period which would of course vary with circumstances but is not likely to amount to 48 hours if doors and windows be open in a current of air. As the steam could not be used upon cold surfaces within the carriage without undergoing condensation the

the surfaces would become
wet, and here also drying would
be required. Lastly, if readily ef-
fectually applied and if either
glue or varnish be used in
the interior of carriages, much
deterioration leading to expensive
renovation would result. I
therefore believe that disinfec-
tion with perchloride of mercury
solution is safe, simple and
effective, and that whilst the
efficacy of steam when ap-
plied under correct conditions
in properly constructed machines
is indubitable, there is no reason
to consider that any advantage
over perchloride of mercury
solution would be obtainable
when used in interiors that
could not be uniformly brought
under its influence, whilst
its after effects cannot fail
to be very far from economical.
These facts seem to me suf-
ficient explanation of the general
preference for the use of the power-
ful disinfectant-perchloride
of mercury, and I see no reason
to depart from the instructions
contained

contained in the G.O. on this ques-
-tion. At the same time, if the
Superintending Physician will
work out the necessary data
carefully and fully, and will
place the matter beyond mere
expression of opinion at which
stage it actually exists, this Office
would be glad to have what
might form an interesting
series of experiments at dis-
-posal for general information,
and would gladly support
any necessary change in prac-
-tice founded thereon.

I have the honor to be
Sir

Your most obedt Servt
W E King.

Sanitary Commissioner,
Lisbon.

The following is
the G.O. on this
subject
changed
of present