

Public Works (1898) Department.

RAILWAY BRANCH.

G.O., No. 68. R.

DATED 13th Jan'y 1898.

Includes

H.R.M. of 6-12-1897.

[Despatch Abstract]

Bubonic Plague
Pres. L. du Dept. stating that the Govt. agrees
with the Sanitary Commissioners in considering
that no change is desirable at present in the
mode of disinfection of Railway Carriages,
Communicated to the Dy. Commr. concerned

Indexed.

Recd
28/1/98

3/1/98

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
	299R		30-4-97				

FURTHER PAPERS.

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

*Copy of a communication from the Agent, S. J. Ry. to the Com-
missioner for Railways, Madras, No. 1127, dated 26th November 1897.
With reference to Government Order No. 299 R, dated 30th April 1897.
I have the honour to forward for the consideration of Government a
copy of letter No. 4/176, 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 advantage of
cheapness, rapidity, and thoroughness of penetration, that if effective it
should, I consider be permitted. Mr. Coliner's suggestion appears to me reason-
able that I am not delaying this reference for the further particulars he
promises.*

*Copy of a letter No. 4/176, dated 22nd November 1897 from the Superintending
Physician, to the Agent, S. J. 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 des-
troyed. With the only means at present available to us, chemicals of more or
less potency, or 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, D. of 21st April 1897, embodied
in G.O. No. 299 R dated 30th April 1897, founded as they evidently are on the sug-
gestions of the last Venice Conference, appear to ignore these considera-
tions regarding current practice in the disinfection of Rly. 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 G.O. referred to as orders not to be violated. The employ-
ment 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
unnecessary.

2. The methods in use now may be divided into two classes:—(a) fumi-
gation with sulphur and (b) the application of various known bacteri-
cides in solution of water. To discuss these separately would prolong this
letter to an unreasonable length. So I will observe briefly and generally.

Sulphur is totally untrustworthy. The difficulties in the way of ^{utilizing} it are considerable. The $S.O_2$ gas when generated is mostly wasted. If in an anhydrous state it is not antiseptic, but the moisture left on the walls of the carriage by the most liberal dose, even at the most liberal rate 2 litres, capable of absorbing (and forming the germicide sulphurous acid $H_2.S.O_3$) only some 100 litres out of 1000 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 for excellence, the lurking places of micro-organisms) are untroubled. Silver coin covered with a single layer of cotton wool, and kept on the floor and seats, and thin silver were inserted into the crevices, and found to be untarnished in a carriage fumigated 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 disinfectant it is almost impossible 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 favour their growth.

The strength ordered in the G.O. previously referred to will not certainly kill spores. For this mercuric chloride 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 solution, 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 suitable 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 atmos- pheric pressure has had to do with this neglect. But Esmerich, May, G. Kautz, and Walz set this matter at rest 9 years ago (Gesundheits Ingenieur 1888 pp 674 and 697 and Centralblatt für Bacteriologie and Parasitenkunde Vol. III pp 638 &c). Steam at atmospheric pressure and at $212^\circ F$ and over will rapidly kill organisms.

Over 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

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 quickly inundates the interior of the carriage with steam not under 212 ^{way}. In experiments I found temperatures registered from $212^\circ F$ to $228^\circ F$ after 7 minutes steaming, with a properly insulated pipe and care taken to block all communications between the exterior and interior of the carriage it is possible to get some what higher temperatures. But this I consider unnecessary. A temperature not lower than $212^\circ F$ is all that is necessary. And according to the researches of Esmerich, Koch, and others, superheated 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 in

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 claim for acceptance with us in the railway.

Plague

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

Disinfection of Railway Carriages

1. The disinfection of Railway Carriages has 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 microorganisms can nevertheless escape destruction.

The instructions contained in a letter No. 349 R. I. 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

the disinfection of Railway Carriages. But after some practical experience in these methods, 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 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 of water. To discuss these variations 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 $S.O_2$ 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 can at the most be about 2 litres, capable of absorbing (and forming the germicide Sulphurous acid H_2SO_3) only some 100 litres out of 1000 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}

Crevice between the boards of a Carriage ^{any} way the various recesses (two situations for example the lurking 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 unharmed in a Carriage fumigated with sulphur.

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The strength ordered in the G. O. previously referred to will not certainly kill spores. For this mercuric Chloride 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 solution, 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

The Agent South Indian Railway
to

The Consulting Engineer for Railways, Madras,

No. 1127, dated 26th November 1897.

With reference to Government Order No. 299 R. dated 30th April 1897, I have the honour to forward for the consideration of Government a copy of letter No. 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.

10/6.1201

(1127)

E. R. C. No. 5219

P. W. (Railway) C. No.

No. 44 R.R. dated 6-12-1897.

TRANSFERRED to the ^{Def} Local & Municipal
Department with reference to its No. _____
dated the _____ 1897.


D.R.

*Not Local & Municipal Dept. to
will send to Surgeon General.*

7/12/97

6-12-97

(Indesced)

89
11/26/97

Railway
Public Works (1898) Department.

CURRENT No. 39



Plague

B

18

From

The Local and Municipal Deptt

Order *No 68. Dated 13/1/98*

No. 8 M.

*Communicated to
the Agents Madras & South
Indian Railways.*

Dated 4th January 1898.

Received } 8. 1. 98
Registered }

48/10/1698

Enclosures
Spare copies

DA

SUBJECT.

Bubonic plague.

Stating that the Government
agrees with the Sanitary Commissioner
in considering that no change is de-
sirable at present in the mode of dis-
infection of Railway carriages.

*The Agents Madras
S. I. Ry
Nilgiri Ry
C. I. Ry & the Stat*

Dispatched on 21/1/98

48/10/1698

FURTHER PAPERS.

[25]
2,000-28-4-97

LOCAL AND MUNICIPAL DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

From the Public Works Deptt. Railway Branch, No. 44 RM. 7 ^{Read papers} 6 December 1897,
 transferring letter from the Agent, S. S. Railway regarding the disinfection of
 Railway Carriages.
 From the Sanitary Commissioner for Madras, No. 2628/S., dated
 16th December 1897.

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 later. 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 way will not bear comparison with that for the very small amount of the cheap bazaar chemical 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 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 disease-bearing germs would be under risk of being unaffected.

5. 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 Superintendenting Physician, but till the wood work was dry - a period of 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 surfaces would become wet, and here also drying would be required. Lastly, if really effectually 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 disinfection

disinfection with perchloride of mercury solution is safe, simple and effective, and that whilst the efficacy of steam when applied 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 sufficient explanation of the general preference for the use of the powerful disinfectant perchloride of mercury, and I see no reason to depart from the instructions contained in the G.O. on this question. At the same time, if the Superintendenting 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 disposal for general information, and would gladly support any necessary change in practice founded thereon.

ORDER No. 8 M. Mis., dated 4th January 1898.

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

(True Extract)

H. Fremantle
Ag. Secretary to Government.

To

The Public Works Department: Railway Branch.
,, Sanitary Commissioner.

Smt