On The
Treatment of Diphtheria
by the Internal Administration of Eucalyptus Globulus.

Thesis for M.D. 1885
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Prof. J. R. L. S. Seaver
The University
Edinburgh.

Sir,

I forwarded to you last night, by rail, my thesis for the degree of M. D., which you have received. I trust in good condition.

I find on looking over my copy, that there omitted in the original, to note on the margin the name and
date of Dr. Monge's book on Diphtheria, which
have referred to regarding
Encephal. & Charots Case of
Paralysis of the Brain.
You will be glad if you will
be good enough to add it
for me.

The marginal note should
be: "Diphtheria its Nature
and Treatment to"

Jamaica 1849 1st 54.

Jane Sir

Joins obediently,

A. P. Hallows
In entering into the treatment of diphtheria, it is necessary to take into consideration the primary, and secondary, conditions of the disease. I say primary and secondary conditions, because from the recent advances in the pathology of this disease by Neubauer and others, there can hardly now be any doubt in the medical mind, that diphtheria is at first a local affection, transplanted this infection, either directly, or indirectly, by means of a specific organism, or organisms, producing at the point of contact or virus, at first, a local inflammation, followed by proliferation of the organisms, and the breaking off of ejected material combined with lymph to form the false leathery-like membrane. Which is essentially the characteristic of the disease.
The secondary condition is that in which the general system becomes affected by the septic poison of the disease, so that various other symptoms are set up, as by the products of the local disease being extended into other parts, through the circulatory and lymphatic systems. Becoming affected, whereby we have a morbid state of the blood, likely and of the nervous system set up, producing the blood poisoning which has been so fatal in Diphtheria, and also the various paralyses which often ensue.

In accepting then the theory of the disease being primarily a local one, it naturally leads us to try if possible either to prevent or mitigate the secondary condition. We must therefore endeavor to apply and give suitable remedies.
To obtain such an object, various specifics for this purpose have been recommended, but one, by one, they have proven not to have always the desired effect.

In bringing forward the treatment of whooping cough by the internal administration of Eucalyptus Globulus, I may notice, I do so because in my own hands I have had the most excellent results in every case in which it has been used in thirteen cases in all. I can only give my own experience, as nowhere can I find any record of it having been given internally in this disease, except by Dr. Murray, Gibbes of New Zealand, who used it in the form of steam, derived from the fresh leaves of the plant, it was first induced to give Eucalyptus internally from
The good effects I saw produced by it in the Royal Infirmary of Edinburgh, in the wards of my respected Teacher, Professor Armandale, and in those of Dr. John Duncan, where it was given with much success in cases of severe blood poisoning. While advocating eucalyptus in Diphtheria, I feel that although I had success with it, it still requires a greater trial and much research in its physiological and therapeutic actions, but I believe that when these actions are fully worked out, we will find it a drug in which we have a good and efficient means of setting at the disease. From the experience that have had with eucalyptus, I am led to believe that its action is to attack the local mischief through the mucous membrane and tissues at back of the membranous portion. It would
seem from my own observations to prevent the spread of the disease by either lowering the vitality of the specific organisms, or by destroying them, and at the same time increasing the vitality of the uninjured tissues, so that theEruptions of the parts is to a certain extent prevented, or at least is considerably reduced, and consequently the risk of septicemia is much lessened. In one case, I used anticipated tooda at the commencement, but on the occurrence of severe secondary symptoms I reverted to the Metaphysic treatment, and the good effect produced by it was most noticeable from the beginning of its use. In some cases where had the opportunity of seeing the patients at the first signs of the disease, owing to my attending them.
patients at both houses. I found it (Eucalyptus) entirely checked the further progress of the disease, while in the other, only a few small patches of false membrane appeared, disappearing on the third day, without any systemic disturbance.

In noting the effects of Eucalyptus generally on those receiving it, I found that the breath became strongly impregnated with the odour of Eucalyptus, that the heart's action was strengthened, so that the hyperaemia round the patches decreased very quickly, I also noticed that the desire for food was increased, and that when fever was present, it quickly abated. The urine was increased in quantity, and smell, though of Eucalyptus, the salivary secretion was much increased.
I contained Eucalyptus. All those taking the drug inhaled freely, and in no case was their sleeplessness. In the case previously mentioned where I discarded the carbonate of soda, the patient had been much troubled with want of sleep, but, after taking the Eucalyptus mixture, sleep returned and she asked me if I were giving her anything to make her sleep.

The only bad effects I observed were in some cases, headache, and a tendency to vomiting, these I found were best combated by the addition of 0.5 Hypochlor, or 2 Belladonna to the mixture. In one case where the diaphoresis was excessive, I found that sulphuric acid soon checked it.

As previously stated I have not been able to find
any literature directly bearing on my subject, but on the subject of its beingSeven internal,
AGue. Herzy in his Article
in Zeurnes’s Encyclopedia on
Malarial Fever, quoting from
the observations of Siegen and
Mees, says, “The trials made
on inferior animals, and in
which the Ethereal oil extracted
from the leaves the Eucalyptus,
was used, show that the tempera-
ture of the body is lowered
thereby and that fluorescent changes
are prevented. According to
Mees, the anaëobic movements
of the colourless corpuscles
are arrested on the applica-
tion of 1/15th to 1/16th per cent. of
the remedy, and in inflammations,
they are prevented from escaping
through the walls of the
vessels, just as under the
use of gunfire especially if
the crops nearest to be exposed.
directly to the fumes of the eucalyptus. From this it would seem that, my views as to its preventing or lessening septicemia are to a certain extent borne out, and it is evident that these experiments are most valuable in helping to explain the action of eucalyptus on the blood; by restraining the white corpuscles from escaping through the walls of the blood vessels, it must naturally help to keep the inflammatory process from spreading, and to prevent the surrounding tissues from being impaired. The above experiments however were only in reference to local application. Barthelemy in his Materia Medica regarding the physiological action of eucalyptus on the blood says, "The essential oil is readily diffusible".
and enter the blood with facility. This along with the next quotation that I make from the same Author, appear to me to show how the drug is enabled to act on disease locally. Bartholow again says "the eucalyptus is eliminated by the thin, mucous membrane of the bronchial tubes, and by the kidneys, the secretion of these organs being increased by it, and they are impregnated with its odour." In increasing the secretion of the mucous membranes is a valuable property, while at the same time, the secretion is impregnated with eucalyptus and augmented in quantity, must certainly be an evidence of the way in which the drug acts indirectly against the septic organisms, and help in detaching the false membrane.
In reference to the organisms themselves, various authorities have shown that they grow and proliferate, much more effectively and more rapidly, in CO₂ or such an atmosphere. In accordance with this it would seem as if when the septichetic germ is implanted, that there follows some action on the blood from which the corpuscles do not perform their functions, and oxygen is not assimilated; consequently CO₂ is in abundance; at first it may only be in the local tissues, at the affected part, but later on, we have a condition induced of the various tissues of the body being deprived of the proper oxygen to preserve the Carson, so that suppuration would take place, if such a state of matters is allowed to go too far. To ward off this and assist the blood, seems
to be the true reason why the perchloride, and other oxygen
swamp compounds, of these, have
been so valuable. To me
Eucalyptus appears to have some
specific action on the blood,
in assisting in its oxidation,
or it may be that it acts
as a preventive, in the way
that has already been named,
by reducing the inflammation
and waste of tissue matter,
while at the same time it has
a specific action on the germs
themselves. What is this specific
action on the germs, and how
is it brought about? It must
be in one of two ways, or it may
be in both such ways, i.e., either
by a directly toxic effect on the
germs, or by acting on them
indirectly, through causing a
large diminution in the CO₂,
and supplying its place with
oxygen. The first way, or theory,
seems to me to be that in which eucalyptus gives its beneficial effects in diphtheria, and I 
strongly believe that in using eucalyptus, it is necessary to 
give it internally. I have tried it in the form of the oil, as a 
local application, but I cannot 
say that the result was satisfactory, which still more confirmed me 
in believing what I have previously 
stated, that eucalyptus acts 
both on the blood on the tissues, 
infected and on the infecting 
germs.

It was not until several 
months after that I read eucalyptus 
that I saw Dr. Murray Gibbes 
article in the Lancet of Sept. 
1st. 1883, "On the Treatment of 
Diphtheria by Blue Gum Steam." 
This treatment he has used since 
1881 with great success, it 
consists in employing steam 
obtained by pouring boiling
water on the leaves of the Eucalyptus Globulus, so that the patient inhaled a large quantity of steam impregnated with Eucalyptus. To show how highly Dr. Gibbs thinks of the Eucalyptus treatment and how successful he has been with it, I cannot do better than quote his own words. He says: "Eucalyptus Globulus contains properties which are perfectly antagonistic to the germ of diphtheria. The atmosphere the patient breathes must be saturated with Eucalyptus Globulus. I tried experiments with various preparations of Eucalyptus Globulus, such as the tincture and the essence applied with a spray producer, but could not detect the characteristic odor in the steam, and then I poured boiling water on the dried leaves and at once every one smelled the blue fume. Secondary symptoms, such as &c; &c; &c; &c;"
followed in any case. No internal "
treatment was required, and no "
stimulants or disinfectants "
needed. Two of my colleague, "
in New Plymouth. Have informed "
me that they lost all their bad "
cases of outbreak in the same "
epidemic that I saved all "
mine, therefore I feel perfectly "
justified in saying that in Eucalyptus "
I have a cure for "
outbreak. From this statement "
I see that Dr. Gibb, was "
not successful by the immediate "
local application of the drug "
in the form of the essence, or "
etheric. The steam no doubt "
served a dual purpose in "
The vapour forme, softening the "
false membrane from the outside "
while the Eucalyptus did its work "
by entering the system, and so "
produced the results which I "
claim for its direct internal "
administration by means of the lattice."
A method most easily applicable in this country and certainly one which we can be certain that those nursing our patients can readily comply with.

Dr. Gilbe's statement that "No secondary symptoms such as "paralysis" followed in any case is indeed a splendid result, and in itself speaks volumes for the efficacy of the drug. In not one of my own cases has been a single bad after-effect, except in the first case where I employed Eucalyptus, & then I did not use it until my patient had been already some time under treatment with Iron and Chlorate of Potash, and was in a very serious condition from poisons poisoning. The question is now naturally asked, how can we explain this immunity. To answer this question it is necessary to take
into consideration the conditions which produce diplegia, and how far it can be shown that eucalyptus prevents or combats such conditions.

In the Post Mortem examination, recorded by W. E. Ziemens in his *Cyclopedia* of cases where paralysis supervened, he points out there were numerous extravasations of blood in the brain and along the nerves. Capillary emboli, also were found. This certainly shows that the paralysis was due to the deep blood-throat acting on the nerves, causing an infiltration of pus and lymph cells, and on the nerve centres by causing anaemia there or by the direct specific toxic action of disease at those points, so again the nerves might be affected by pressure on them or the nerve centres. As regards the local paralysis of the throat.
Diphtheria, its nature, treatment &c
1879 p. 57
and buccal muscles, that it 
must be explained by 
the direct action of the poison 
on the peripheral ends of the 
nerves, and in evidence of this 
Dr. Harrell McKenzie mentions 
the fact that "bulbous and chorda" 
found in a case of paralysis 
of the velum palati that 
the motor nerves of the part 
consists of tubules, emptied of 
their medullary substance, the 
neural elements containing numerous 
granular cells, ellipsoidal in 
form and in some instances 
mucolized". From these pathological 
extracts it is therefore obvious 
that the disease must have 
extended largely without in any 
way being checked, and also 
that the necrosis of tissue and 
blood. Hydrenia together with the 
specific poison must have 
produced the after-effects. Now, 
on looking at these facts it-
Shows that if we employ a remedy which will prevent the separation and disintegration of the blood constituents as well as the entry of deleterious matter into the blood, or at least such a remedy as will mitigate these conditions, such after-effects as paralysis would not occur. I have tried in this thesis already to show how Eucalyptus acts so as to fulfil the above requirements by preventing the impairment of the vitality of the diseased tissues, and also by its evident specific action on the blood. I must say that I quite agree with Dr. Gibbes when he says that we have in Eucalyptus a drug which is thoroughly antagonistic to the germs of diphtheria, and I trust that the foregoing may attempts to make clear the action of this valuable drug.
are such as will stimulate others to take it into consideration. What I have written is almost entirely from my own observations in cases under treatment by myself. The quotations from the Authorities, named being used to endeavour to prove my statements.

If I may be pardoned for transgression from subject, I would like to draw attention to the exceeding usefulness of Eucalyptus in Focul Bronchitis. In his cases, I have had under treatment the results obtained by it have been most satisfactory. This must evidently be from its specific action on the Bronchial Mucous Membrane mentioned by Bartholow, with patients had been treated with the usual remedies, and as a last resource uses mixture of Eucalyptus Globulus.
After the second day of its use the fever was reduced to a minimum, while at the same time, the general health commenced to improve. At the end of a week's time the fever had disappeared, and the appetite was so altered as not to give any patients any discomfort, which in itself was a most valuable result. In administering Dr. Eucalyptus I give it in 3p doses for an adult, in 20 for a child every three hours, in severe cases, every two hours, along with it I give 1/2, Ammonia, or 1/2, Spirit Ammonia, as the addition of Ammonia appears to me to intensify the action of Eucalyptus, while at the same time its stimulant effects are beneficial. On first seeing the patient I order the bowels to be well relieved, and for this purpose...
I have found Jalap and calomel the most suitable remedies.
As regards local treatment, I have used steam through an
inhaler, to accomplish this.
I find the easiest method is to have the patient's bed
placed within easy distance
of the fire, on which is
placed a large iron kettle
to the extent of which I have
an indiarubber tube attached
of sufficient length, so that
the vapours can easily be
brought to the patient's mouth.
In this way an apparatus
that can easily be managed
by three nurses the sufferer.
I may mention that to have
a continuous supply of vapour
it is necessary to have two
kettles, so that when one is
exhausted the other may take
its place. In order to avoid
the steam being interfered with while
the room is being aired and so that it may not be interfered with by draughts, I had a tent erected at the head of the bed. In the last two cases I have treated I did not use the vapour inhalation, in the one case because the friends of the patient had redenunciations as to the effect of bleach on the lungs, and in the other case the patient objected to it as he suffered previously from Asthma, which he informed me was easily brought on by exposure to bleach or a vapour atmosphere. These two cases did suit as well as those in which I used bleach inhalations, so that although I firmly believe that bleach has a beneficial effect on the false membrane in loosening it & relieving spasm of the throat &c. in my case of cases, try again.
to do without it. The only
other local applications I have
used are the Strong Solution of
Sodium of the Edinburgh Pharmacopea,
and the Glycerrhinum Boracis of the
British Pharmacopea. Applied
the Glycerrhinum Boracis over the
false membrane, and when
it was thrown off, I washed the
membranes part with the Boracic
for two or three consecutive
days.
As regards stimulants, I only
ordered brandy in his case,
_i.e._ in my first case where
I had already mentioned my
patient has been under treatment
with Iron & Chlorate of Potash,

in the other case mentioned where
I had used Salicylate of Soda,

in both I only did so because
the patients were asthenic but
in none of those treated from the
beginning with Eucalyptus was
there any call for Alcohol.
One of the most important essentials of the treatment of Diphtheria I have found to be the proper administration of good easily digested food, such as egg, fish, beef, tea, milk (boiled), chicken, broth, &c. in small quantities at short intervals during the day & night. In the latter more patients seem to require it often & I have several times seen in Diphtheria & Fever sleeplessness induced owing to want of proper feeding in the night. One old nurse told me that while nursing fever cases she had many times sent her patients to sleep by feeding them.

In providing a suitable drink which many patients call for, I have found lime juice to be excellent in allaying thirst. I use it because a medical friend in China has informed
me that the Chinese employ it alone in the treatment of diphtheria with much success.

In concluding this thesis, I would like to mention that in very last case, I used a gargle made from the liquid extract of Sambucus, an American herb. The proportion being one ounce of the extract to eight of water. I have only had the chance in the one case of observing its effects on diphtheria, as I have not had a case since, but I intend to still further try it. I am induced to do this from the favourable results I have obtained with it in fliny, ulcerated sore throat, local p vids from blood poisoning (one on thumb, one on arm, one on ankle) and in foul ulcers. Its good effects were very decided, especially after using unsuccessful ordinary remedies. It is a drug which has not yet been
Tested in this Country so far, as I know, at least there is no record of it; from what I have seen of it in my own hands it has shown itself to be a very superior antiseptic and a swift healer.

Having now exhausted my subject I would state that I have not given a detailed list of my cases, as I have mentioned in the foregoing the principal effects and symptoms generally observed in each case while treating it with Eucalyptus. I hereby certify that all the foregoing matter writing in connection with this Thesis is entirely from my own observation and is my own composition.

H. W. ALLORN
M.B. & C.M. Ed.

Dundee 29th April 1885