

The disinfection of scarlet fever and other infectious diseases by antiseptic inunction / by J. Brendon Curgenven.

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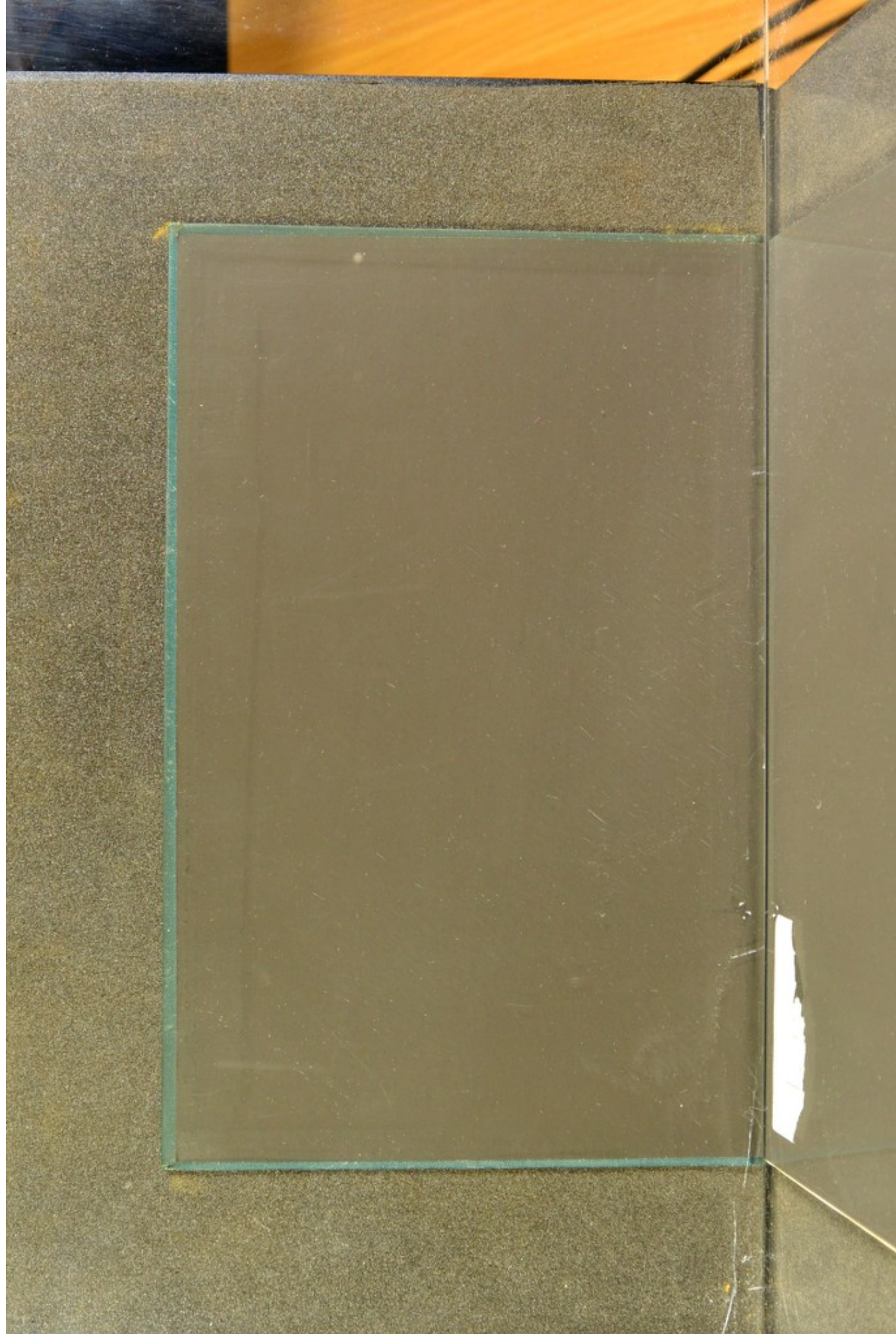
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THE DISINFECTION OF
SCARLET FEVER

CURGENVEN



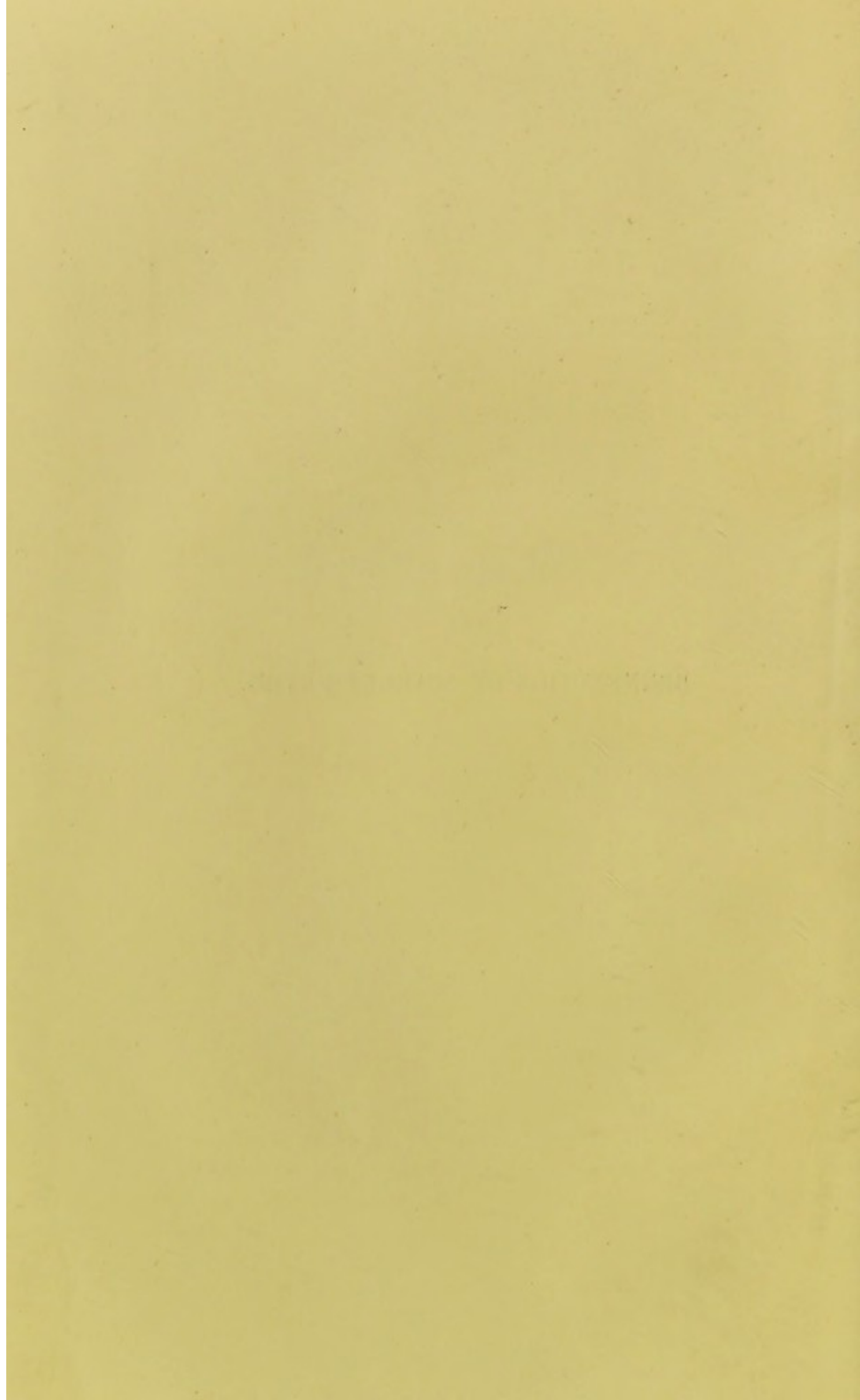
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OF
SCARLET FEVER
AND OTHER
INFECTIOUS DISEASES
BY
ANTISEPTIC INUNCTION



BY
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PREFACE.

To enable me to comply with the requirement of the Council of the Congress, that the reading of a Paper should only occupy fifteen minutes, I was obliged to compress what I wished to say into the narrowest limits, and even then I was unable to read the whole in the time allowed.

Before publishing the Paper I have prepared an Appendix giving more detail to make my argument clearer, and I have added also a table of temperatures. In the Paper I was obliged to confine my remarks to Scarlet Fever, but I have given a short account of my experience with Eucalyptus in the treatment of Diphtheria and Measles in the Appendix.

THE
DISINFECTION OF SCARLET FEVER
AND OTHER
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BY
ANTISEPTIC INUNCTION.

For the last twenty years, or since Dr. Budd first advocated the inunction of olive oil in cases of scarlet fever to prevent the diffusion of the cuticle, and thereby the spread of the infection, I have constantly, as opportunity offered, directed my attention to the subject of disinfecting the cuticle by inunction, and thus prevent the dissemination of the poison.

Of the popular disinfectants I may say that not one is suitable for inunction over the whole surface of the body of a young child; some because they are too poisonous, others because their solutions in water or oil, or their admixture with fats, vaseline or lanolin are injurious, by obstructing the natural action of the skin, so necessary during fever beyond even the requirement of health. Oil and fat also soon become rancid from the heat of the body, and are in this way very obnoxious to the patient.

Carbolic acid, bichloride and biniodide of mercury, salicylic acid and resorcin, have each been advocated for inunction since I published my first cases treated with the eucalyptus disinfectant.

Carbolic acid is useless for inunction as a bactericide, for the 10 per cent. solution in olive oil has been shown by MM. Vidal and Chantemesse as incapable of destroying the diphtheria bacillus, and the experience of Bucholtz, Garrigues

and Hirst, coincides with that of all modern bacteriologists as to the unreliable character of carbolic acid as a disinfectant. The inunction of a 5 per cent. carbolized oil, as practiced by Dr. Brown and others, can have absolutely no disinfecting effect, it merely acts as the olive oil of Dr. Budd. The vapour of carbolic acid given off at the ordinary temperature of the air has no effect whatever on infection, nor does it deodorize nor assist in oxidising gases.*

Not only is carbolic acid useless as a germicide for the purpose of inunction, but it is a highly poisonous drug to place in the hands of the public. The Registrar-General's Report for 1888, shows us that of 701 people who died of poison in that year, 260 by accident and 117 by suicide, carbolic acid was accountable for 37 poisoned by accident and 64 by suicide, or rather more than 1 in 7 of the deaths by poison, and more than one-half of the suicides. I am only one of many who are of opinion that this drug should be discarded as a disinfectant and placed on the schedule of poisons.

Jeyes' fluid is an emulsion, in a solution of a resinous soap, of creolin oil, phenols and pyridines, products of coal tar. No one could advise the application of such an emulsion to the surface of the body.

Creolin has been tested by Esmarch, Eisenberg and others, who have reported that its germicidal properties are inferior to carbolic acid. It is also poisonous, cases have been reported shewing its poisonous properties both through vaginal injection and inhalation.†

Bichloride and biniodide of mercury are altogether too poisonous for inunction over the whole surface of the body, and for the same reason it is not safe to place them in the hands of mothers and nurses for any such purpose; yet they have found advocates for their use in both scarlet fever and in small-pox, and in spraying the throat and nares in diphtheria.‡

* Appendix (1).

† *Vide Lancet*, Oct. 19, 1889, p. 811.

‡ Appendix (2).

Thymol, resorcin and other germicides have been used mixed with vaseline, lanolin, lard and olive oil. In this form they all possess the objection previously stated, in that the unguent or oil obstructs the action of the skin, besides being exceedingly objectionable to the patient. Another reason for pronouncing against this form of application is that all fats, fixed oils and alcohol have been proved, by many observers, to considerably diminish and in some instances to destroy the germicidal power of the drugs mixed or dissolved in them.

My attention for the last few years has been directed to the practical investigation of the power of essential oils as germicides, antiseptics and anti-ferments, and their use in the treatment and disinfection of scarlet fever, diphtheria and other infectious diseases, but more especially of the two diseases named.

I have found that a half or even one-third per cent. of many of the essential oils, such as cassia, cloves, cinnamon, eucalyptus or cajeput, will preserve milk, cream, paste, beef-broth or hay infusion from decomposition or fermentation, in fact, prevent the development in them of any bacilli bacteria or other micro-organisms.*

Air fully charged with the vapour of many of the essential oils will destroy the bacilli of diphtheria, typhoid, tubercle and anthrax,† and it will preserve beef and hay infusions from the development of micro-organisms.‡

Air takes up or dissolves more of one oil than of another, but the saturated solution of one is of nearly equal power as a germicide as of the other, although the air may only dissolve $\frac{1}{100}$ part as much of the one as of the other. A drop of the oil of cassia or cinnamon will take nearly ten times longer to evaporate or become dissolved in the air, than one drop of eucalyptus or cajeput oil; the denser the oil as a rule the longer it takes to evaporate, and less is taken up by the air. Equal volumes of air impregnated to saturation with the two

* Appendix (3).

† Omelchenko, of Kief.

‡ Mayo Robson, of Leeds.

former are equally germicidal as with the two latter although containing considerably less of the oil vapour.* In practical use the oils of eucalyptus and cajeput are the best, because they more quickly evaporate and fill the air to saturation. The ready bactericidal capacity of any essential oil depends on its volatility and diffusibility. They are not all equally adapted for use on the skin, as the dense oils of tardy volatility are as objectionable as a fixed oil, and some irritate the skin, as the oil of cassia, which will blister if used for two or three days. When several essential oils of unequal volatility are mixed together, air will take up more of the combined vapour than when only one is used, and we get a more powerful disinfectant action.

Dr. Bucholtz has shown that eucalyptus oil is more than three times stronger than carbolic acid, in that it required a strength of 1 in 200 of the latter to prevent putrefaction of blood, whereas 1 in 666 only of the former produced the same result. This does not depend solely on the eucalyptol it contains, as is erroneously believed, for other oils containing no eucalyptol, but various hydro-carbons and camphors, are equally strong as germicides, and Dr. Omelchenko has proved by experiment that the vapour of eucalyptol does not destroy bacilli so quickly as that of the oil of eucalyptus itself, the former taking 134 hours to kill the bacilli of anthrax, while the latter destroyed them in 72 hours.

In disinfection by inunction eucalyptus and other essential oils are more suitable than any other form of disinfectant in that they rapidly volatilise and fill the air to saturation, their vapour being as powerfully germicidal as the oils themselves. For this reason I have in practice used Tucker's eucalyptus disinfectant, which consists of two or three essential oils of different densities, with thymol and camphor dissolved in the oil of eucalyptus globulus. It contains no fixed oil nor alcohol, and it evaporates rapidly and com-

* A litre of air will dissolve only 0.0005 of a gramme of the oil of cinnamon, but the same volume of air will dissolve 0.0286 of a gramme of the oil of eucalyptus globulus. (Omelchenko).

pletely. In using inunction in scarlet fever the whole surface of the body is lightly smeared over with the oils, night and morning, for three days, not omitting the skin behind the ears and in other positions that might be overlooked. It is also rubbed on the scalp once a day. After the third day the skin is anointed only at night after a warm bath, for seven days, when this treatment ceases and the patient joins the rest of the family. If there arise any complications or sequelæ of an inflammatory character they must be treated in the usual manner.

The oils applied to the surface of the whole body produce a slight stimulating effect on the skin, with a sense of general warmth.

Children restless and sleepless with fever go to sleep soon after the inunction; the temperature drops three to four degrees, and the pulse becomes less rapid. The oils rapidly evaporate from the warm skin of the patient, and fill the air around to saturation with their vapour, this, inhaled with every breath, disinfects the mucous surfaces, penetrates to the farthest vesicles of the lungs, is absorbed into the blood, and acts directly on the poison throughout the body. Absorption takes place also from the skin, and the oils are there brought in direct contact with the poison which is deposited in the intercellular spaces of the cuticle. An emulsion of the oil should be administered, and the throat brushed with the disinfectant, but this is not essential, as in the majority of cases the inhalation of the vapour is sufficient to relieve the local inflammation.

The eucalyptol, thymol, terpene, cymene and other hydrocarbon bodies are discharged from the circulation, partly by the kidneys where they destroy the poison that would injuriously affect those organs.

It cannot be denied that if the vapour of these oils, given off at the ordinary temperature, will preserve sterilised fluids from the development of bacilli,* and will destroy the bacilli

* Mayo Robson.

of typhoid, anthrax, or tubercle in cultivated mediums* and the trichina spiralis,† they must be able to destroy the pathogenic poisons of scarlet fever, diphtheria and other diseases when brought in contact with them in the human system.

The active stage of development of the poison in these diseases lasts for six or eight days, after which the body casts off from its tissues the germs and products of the disease. If we can succeed, prior to the eighth or tenth day, in destroying all the germs of the disease developed, the patient will be incapable of infecting any other person.‡ This is accomplished by this method of disinfection by inunction with the volatile oils, without any isolation whatever. In upwards of twenty cases treated by myself and my son there was not one case of infection from the patient. They joined the rest of the family after the tenth day, except one or two cases with sequelæ, that did not come early under treatment, and in several instances the patients were never separated from the healthy children.

Isolation in the homes of the working classes is impossible, it could not be carried out in such homes except after the manner practised by a Health Officer last year :—“ He had isolated a whole family in a house for six weeks on the undertaking that the father's wages should be paid by the Council.”§ This means a cost to the ratepayers of £8 or £10; and if the patient be removed to the hospital the cost is just as much. In contrast to this, the cost of the eucalyptus disinfectant for an average case does not amount to more than 10s., and yet when I proposed my method of treatment to one of the Officers of the Local Government Board, I was told that the cost of the oils would be too great!!

The earlier a case comes under treatment by inunction the greater the probability of cutting short the disease.

* Omelchenko.

† Schultz.

‡ Appendix (4).

§ *Public Health*, May, 1890. Appendix (5).

When inunction is commenced in the initial stage of headache and vomiting, the fever does not develop and no rash appears, the patient being quite restored to health in from 24 to 36 hours. If the case be in the first day of the rash the fever subsides in 12 or 24 hours, no more rash appears, and the patient is quite well in 2 or 3 days. If the case does not come under treatment until after the second day the subsidence of the fever is not so rapid, and if the throat is ulcerated, the case may be prolonged by sequelæ, on which the oils have little influence, but uncomplicated cases recover in about 4 or 5 days. In all cases brought under treatment before the rash is fully developed, the desquamation is very slight, and we may surmise that the epithelium of the kidneys is likewise preserved and the most serious sequela of the disease prevented. The disinfectant kills the poison before it has had time to destroy the epithelium either of the skin or kidneys.*

The vapour of the oils surrounding the patient destroys all infection proceeding from him and absolutely isolates him in his own bed. It penetrates the bed and bedclothes and pervades the whole room, so that no infective germs can escape destruction. The disinfection of the bedding and the room is accomplished *pari passu* with the treatment of the patient, and they require no subsequent disinfection. The patient can after an ordinary mild attack return to his school or occupation after the tenth day instead of undergoing the long period of isolation of 6 or 8 weeks, as the cuticle is completely disinfected and cannot convey infection to any one.

In confirmation of my statements, I submit extracts from four letters written to me by gentlemen who are strangers to me, as I prefer to give this testimony rather than that of my friends.

Mr. Cartwright of Lentwardine, says:—

“I have probably used more eucalyptus than any man, especially in scarlet fever, and have been able after rubbing

* Appendix (6).

them with the disinfectant, to place them at once amongst members of their family that never had it, nor has it ever in one single instance failed me, and I have had but the one case in the house."

Dr. Elsom of Whitwell, Chesterfield, says:—

"I have for some time adopted the treatment of 'eucalyptus,' and have unbounded confidence therein. I have had several cases in which one member alone (by careful and guarded use of the oils) went through a severe course of scarlatina without another member of the family taking the infection, though the attendant with but very slight personal restrictions looked after all the members of the household as to their daily wants. I have perfect confidence in eucalyptus as a means of ridding us of the undesirable necessity of seeing our patients go to the hospital. The treatment wants but a careful supervision to make it a certainty of success."

The Rev. Henry Parker, Rector of Mount St. Mary's College, Chesterfield, writes:—

"I am very happy to add the following facts for which I can vouch.

"(1) Between March 22 and April 10 of this year (1891), we had a series of scarlatina cases, about 15 in all. Seven of these were of a malignant type, causing us grave anxiety. On April 10 I received six bottles of the eucalyptus fluid—Messrs. Tucker's disinfectant fluid—and immediately we used it as spray upon the beds in all our dormitories, we also had the sick boys well rubbed with the fluid.

"(2) No new cases occurred for a week, and those who were already ill improved rapidly."

"(3) Owing to a blunder of a railway company, we were without a fresh supply of the fluid for seven days. During that time four cases were added, but of a mild type.

"(4) The cases again fell off as soon as we again sprayed the fluid in the dormitories, but on the seventh day our last occurred. The boy was 'inuncted,' and in eight days he was quite convalescent.

"(5) In *every case* where inunction was employed as soon as the case was discovered, the sickness was of an exceptionally mild type. One of the professors, however, who was not rubbed with the fluid, all but died. His throat was as bad as either our doctor or myself have ever seen.

"(6) *Influenza* has been very violent all around us. Several of our servants have suffered from it, yet of those who live and sleep in the College, about 210 in all, not one has clearly shown signs of that sickness, although three seem to have had it partially and in a modified form.

"I regard this eucalyptus fluid as the most valuable thing I know of for a public school. Hitherto we have always been in some anxiety after the Xmas holidays, now, thanks to the eucalyptus fluid, I have little fear about the future."

Mr. S. Peake, M.R.C.S., &c., of Shepherd's Bush, says:—

"Having read your paper on the treatment of scarlet fever, with oil of eucalyptus, in the *British Medical Journal* of March 29, 1890, I thought you would be interested in learning my experience of the same remedy.

"In March last (1891) my youngest child, aged 4 years, was taken ill in the usual manner with scarlet fever. Dr. H. Campbell Pope was called in and confirmed my diagnosis. The onset was severe, the temperature when the rash appeared over 103°, and the child was occasionally delirious. Tucker's eucalyptus emulsion was given, the child rubbed all over with their disinfectant fluid (A), and the air in the room kept saturated with the vapour of it by means of a spray diffuser. My other two children, aged respectively 6 and 8 years, were each given a dose of the emulsion, and brought into the room, and the three children were kept there for 8 days, taking the emulsion three times a day. At the end of that time the two eldest had not taken the disease, nor have they had it since, so were removed.

"My little patient soon after the first inunction, and taking the emulsion, fell into a sound sleep of some hours duration, and awoke quite refreshed and sensible, and its temperature had come down to 100°, which it never after-

wards exceeded. The rash lasted 3 days, and although it was very vivid when at its height, desquamation was very slight and over at the end of 10 days from the beginning of the disease.

"I saw the children each day after seeing my patients, attended 5 cases of midwifery, all of whom did well, and had not an unfavourable symptom.

"I have treated other cases of scarlet fever with eucalyptus with equally satisfactory results. My opinion of the remedy is that it cannot be too well known."

Baron Ferd. von Mueller, M.D., F.R.S., &c., writes :—

"It was very kind of you and thoughtful to send me your important essay on the use of eucalyptus oil, strengthened still more antiseptically by thymol, &c., in the treatment of scarlatina. Nothing could be more rational, and you will earn the blessing of numerous mortals who will thus have their life prolonged and their sufferings thus far alleviated."

Baron von Mueller holds the position of Botanist to the Government of Victoria, and is the author of a large work on the eucalyptus tribe, published in quarto with 110 plates.

The only statistics that I can give may be summed up by stating that out of 26 cases of scarlet fever treated by myself and my son, not one case of infection occurred. Many of the children were not separated from others of the family, and in those instances where they were separated, they rejoined the others again after the tenth day regardless of the desquamation, and with perfect safety.

Not only does this disinfectant prevent effectually the communication of any infection from the patient, but it appears to destroy the poison when in the stage of incubation, or when exciting the initial symptoms, as the following cases show.

Three young children were exposed to the infection of scarlet fever whose nurse had the disease and was not separated from them until the second day. The air of the nursery was kept well saturated with the vapour of the disinfectant for a week; they were kept in it for three days

and nights, after which they were allowed out for their usual walks, and they escaped the disease.

A girl slept with her sister who had the fever, and was not separated from her until the third day. She was seized with violent vomiting and headache on the fifth day. The free use of the disinfectant prevented the development of the fever.

A young girl showed the premonitory symptoms on the second day after being separated from her brother when he was in the third day of the fever. She was kept all one day and night breathing air strongly saturated with the vapour of the disinfectant, and she recovered in 24 hours without showing any rash.

A boy staying in Devonshire with his cousins, who were ill with scarlet fever, was prevented taking it by the personal use of the disinfectant sent to him by his mother, but his brother in London took the disease, through, it was believed, a roll of music, received through the post from the infected house. He had it very severely, was delirious, and his temperature rose to 104.4° on the third day. On the fifth day he felt quite well, was up on the eighth, and joined the rest of the family on the tenth. During the whole time of his illness two other children were constantly in his room, playing on and about his bed. This is the only case within my knowledge in which the temperature did not go down with the commencement of the inunction, being a severe case this was used every four hours.

One other case I will mention. The wife of the master of a large parish school, and the mother of several young children, was sent to the fever hospital with the disease. She was there four weeks, and would have been kept there two or three weeks longer. She was anxious to return to her family, and to enable her to do this sooner, she was taken by her husband to a lodging, eucalyptus inunction was used, and she returned home at the end of a week, before desquamation had terminated.

No one with an unbiassed and unprejudiced mind could

hesitate to acknowledge that this method of treatment and disinfection by inunction is a most valuable addition to our power of overcoming infectious diseases. Yet of all the medical officers of our fever hospitals, one had only sprinkled the bed of a moribund patient with the disinfectant, and pronounced it a failure. Another had administered to 47 patients the eucalyptus oil of commerce, which made them very sick; he used no inunction, nor did he sprinkle any about their beds. There were 20 cases with more or less serious sequelæ, of whom 4 died, and he condemned the eucalyptus treatment in strong terms in the *Lancet**. Now of more than twice the above number treated by the gentlemen whose letters I have read, there has been no serious sequelæ, and no death. Amongst those treated by myself and my son, there was only one with complications, but she only came under treatment on the third day of the fever, and we had no death.

Let general practitioners keep their patients at home and treat them by this method, the object of the Government will be attained, as there will be no extension of the disease, and at the same time there will be no need of the six weeks isolation. In addition to all this the ratepayers will be saved the enormous expense of the present system of isolation hospitals.

APPENDIX.

(1) Dr. Busey† recommends that, "twice daily the body should be anointed with an ointment composed of carbolic acid, 30 grains, thymol, 10 grains, vaseline, 1 drachm, and simple ointment, 1 drachm; or the following salve, resorcin,

* See Appendix (6).

† Article, "Scarlet fever," *Cyclopædia of Children's Diseases*, 1889.

1, lanolin, 6, and oil of sesame, 2 parts." I looked to see if there were an *errata* to the book, for it certainly struck me that 30 grains of carbolic acid to 2 drachms of ointment, or a strength of 20 per cent., was rather too strong to apply such a caustic drug twice daily over the entire surface of the body of a young child; besides, the unguental form of the application, as well as that of the resorcin which he advises, is objectionable for the reasons I have stated. There is some danger too in rubbing fixed oils, fats or vaseline over the whole surface of the skin, especially during a pyrexial condition, as the impediment to the action of the sudorific and sebaceous glands may give rise to nephritis, pneumonia or meningitis. It is related that in Lincolnshire it was the practice some years since to rub oil over horses after they had been singed, several of them died of nephritis and pneumonia, and the practice was abandoned.

(2) In 1882 Dr. Tarnier introduced the practice of using a weak solution of corrosive sublimate as a vaginal douche after child-birth, and the practice extended widely both on the continent and in this country. It acts as a good antiseptic in preventing septicæmia and puerperal fever, but its use has been attended with many deaths from mercuric poisoning. Drs. Dakin and Boxall have published careful observations on the subject in the *Transactions of the Obstetrical Society* for 1886 and 1888.

Virchow, Stieffek, Legrand and others have reported fatal cases of bichloride of mercury poisoning from the use of the vaginal douche terminating life by enteritis and nephritis.* A solution of 1 to 3000 has a strong coagulating effect on the secretions of the genital tract, and as Hirst says, "is liable to defeat the very purpose for which it is used by covering the surface which it is desired to disinfect with a layer of insoluble coagulum."

I have in many cases used an emulsion of eucalyptus oil as a vaginal douche and have found it to be equally effica-

* *International Jour. of Medical Science*, Sept., 1889. *Ann. Gyn. et D'Obst.*, June, 1889.

cious as a deodorant and antiseptic, without possessing the poisonous properties of the bichloride.

The strength I have used has varied from half an ounce to 8 ounces of warm water, to equal proportions of emulsion and water, using Tucker's emulsion of the oil of eucalyptus *globulus*. If there be any raw surface it causes a little smarting when the douche can be lessened in strength.

Dr. Mervin Maus recommends (*Medical Record*, June, 1889) that the patient with scarlet fever should be sponged over morning and evening with a 4 to 1000 solution of bichloride of mercury until he leaves his bed, or for a week to 10 days, and then to continue with a 1 to 1000 strength until desquamation is completed, rubbing in also daily over the whole body an ointment with borax, oxide of zinc and vaseline. Dr. Bianchi recommends in small-pox, washings twice a day with a 5 per cent. solution of boric acid, and afterwards the whole body to be sponged with a 1 to 1000 solution of bichloride.

Knowing the poisonous character of the bichloride, one recoils from its use, especially in scarlet fever, from its tendency to induce fatal nephritis, a complication which is too apt to occur as a sequela of that disease.

From not being volatile its action is confined to the skin, whereas the volatile eucalyptus disinfectant surrounds the patient, disinfects his breath and penetrates to the furthest air vesicles of his lungs to be brought in direct contact with his blood.

(3) The essential oils consist of a fluid hydrocarbon holding in solution an oxidised hydrocarbon, isomeric with camphor. In the oil of carroway there is carvene having in solution carvol; in that of thyme, thymene and thymol; in peppermint, menthene and menthol; in eucalyptus, eucalyptene, cymene and eucalyptol.

(4) The bacillus of scarlet fever has not yet been demonstrated. The streptococcus pyogenes found by Klein and other observers in cases with ulcerated tonsils and suppurating follicles, proceeds from the secondary pyogenic

infection through the formation of pus, and while it undoubtedly gives rise to serious complications and sequelæ in this disease it is not the pathogenic cause of the fever. This streptococcus is found also in typhoid, small-pox, and other infectious diseases where suppuration exists.

A small micrococcus has been observed in scarlet fever adhering to the epithelium scales in colonies, but it is not decided whether these are the germs of the disease or not. In the interstitial nephritis, there is multiplication or germination of the nuclei in the epithelium cells of the kidneys, and the mucous cells of the follicles of the tongue and fauces are crowded with germinating nuclei. The pathogenic microbe or germ of the fever may be stored in these cells and discharged from the body with them.

The eucalyptus disinfectant destroys the specific poison of the disease, and if used on the first or second day of the fever will prevent suppuration and ulceration, and the development of the streptococcus. Thus complications are avoided, but should they arise, the specific antiseptic treatment is not applicable to them.

(5) It is not at all an uncommon experience to find that after patients have been isolated for many weeks, they still convey the infection to others; the mucous cells containing the germs have not all been discharged from the follicles of the tonsils or from the recesses of the nasal cavities, or there may remain epithelium scales beneath the nails of fingers or toes, in any of which positions sufficient poison may remain to infect many persons.

From one Hospital it is reported that "two persons were discharged convalescent from scarlatina. They had been inmates of the hospital between seven and eight weeks. Three or four days after returning to their homes some other members of their families were taken ill with scarlet fever . . . both patients on their return from hospital had a discharge from their nostrils," and the Medical Officer of Health "gave it as his opinion that the discharged patients were the means of infection."^{*} The inhalation of the vapour of

^{*} *Public Health*, May, 1890, p. 6.

the eucalyptus disinfectant during the course of the fever would have destroyed all the germs of the disease in these passages, and stopped any discharge.

(6) There may arise exceptionally severe cases that would not yield so readily to the influence of the eucalyptus. I have not had any; my son had one in which the temperature continued to rise for 36 hours after the commencement of the treatment, and my correspondents only mention having one such case, yet these exceptional cases were out of their bedrooms not later than the tenth day.

Neither I nor my son observed any albuminuria in the cases that we treated, and several medical men from whom I have received reports, only speak of observing a slight amount in a few cases.

In a report I received of the treatment by eucalyptus oil of many cases in one Fever Hospital, there were several cases with complications and albuminuria. I attributed these results to two principle causes. In the first place the eucalyptus oil of commerce was used both for administration and inunction; the patients were made very sick by it, and I doubt not that its effect on the kidneys was not unlike that of turpentine. I consider the inunction of greater importance than medication, both as a remedy, and as a disinfectant, and it should be carried out in the manner I have described in my paper, so that the air around the patient becomes *saturated* with the vapour of the disinfectant.

This, which is difficult of accomplishment in a large ward of a hospital, is easily done in a small room, for it is only when the air is saturated with the vapour that it becomes destructive to bacilli. Vapour given off at the temperature of the body quickly saturates the air around the patient, and is much more destructive to all micro-organisms than air charged with the amount given off at the usual temperature of the air.

Then in the second place, the cases, or most of them, in the ordinary course of events, would not come under treatment in the hospital until the rash was fully developed, and

the poison had had time to produce those changes in the epithelial cells of the skin and kidneys, which necessitate their being cast from the body, and to set up also those ulcerations and suppuration which develop the pyogenic streptococcus or the toxine that is held accountable for some of the complications of the disease. Nephritis is due to the amount of epithelial destruction in the urinary tubules, and this may generally be measured by the amount of epithelial destruction on the skin, the one bears a certain relation to the other. The epithelium can be saved only by inunction during the first or second day of the fever, before the rash is fully developed, for the extent of the rash indicates the amount of the poison thrown to the epithelial surfaces, and the consequent amount of epithelial loss.

There may be some exceptional cases in which there is a greater determination of the poison to the kidneys than to the skin, as there are some in which the poison is thrown more to the fauces or the intestines, but they are few. The absence of albuminuria in all, or the presence in only a slight degree in a few, of the cases treated from the first or second day of the fever by antiseptic inunction, proves that if the poison germ be destroyed before it has completed its destructive action on the epithelium, albuminuria and nephritis are prevented.

TEMPERATURE.

The temperature, Dr. Gresswell states, was normal, or below 99° F., morning and evening for the first time on an average of:—

24 November cases in 12·1 days from the beginning of the illness.

34 December cases in 11·1 days from the beginning of the illness.

30 January cases in 9·8 days from the beginning of the illness.

Dr. Wunderlich gives the temperature of three mild cases which fell below 99° on the eighth, ninth and eleventh days respectively, and the translator of his work on *Temperature in Disease*, Dr. Woodman, gives the seventh to the eighth days as the average of a number of cases.

In those cases treated by the eucalyptus inunction, the temperature in most of them, fell two or three degrees after the first inunction, and reached normal, or below 99° F., from the third to the sixth day of the fever.

According to Dr. Gresswell, the pulse is highest on the first three days of the attack, it then falls rapidly to below 100° about the fifth or sixth day, but in young children not till the tenth to fifteenth day, in most reaching the normal rate about the thirteenth or fourteenth day.

Under the treatment by inunction it falls below 100° on the third or fourth day, and reaches normal about the sixth or eighth day.

DAY OF THE FEVER.	1	2	3	4	5	6	7	8
Average temperature in two mild cases. <i>Wunderlich</i> }	103	104·4	103·5	101·8	100·8	100·2	99·8	98·8
Average temperature in many mild cases. <i>Woodman</i> . }	105	104	103	102	101	100	99	
Average temperature in four mild cases treated by inunction. <i>Curgenven</i> . }	103	101·8	99·8	98·8				
Temperature in four mild cases showing rapid fall after inunction. <i>Curgenven</i> . {	103	99·9	98·8					
	102·8	100·2	98·8					
		103	100·3	99				
		103·2	100·2	98·8				
Case treated by eucalyptus. <i>Bazley Thorne</i> . }		103	100·8	98·8				
Severe case with delirium, temperature increased after commencement of inunction. }	102·4	102·6	104·4	101·4	100	99·2	98·8	
Severe case with complications, inunction commenced on third day. }			104·4	102·5	102·2	101·8	102·4	102·2*

* 9th, 100·6; 10th, 99·8; 11th, 100·8; 12th, 100; 13th, 99.

The pulse in mild cases fell below 100 on the fifth or sixth day. (Gresswell).

The average pulse in the above four mild cases was 120, 108, 98, 82, falling below 100 on the third day.

The pulse in the above severe case with delirium was from the second day, 128, 138, 104, 84, 78, falling below 100 on the fifth day.

Diphtheria.—The use of eucalyptus oil and vapour in diphtheria is not of recent date. The account of Dr. Murray Gibbs' successful treatment of this disease by the vapour given off by the leaves when placed in boiling water was published in the *Lancet* in 1883. He treated 37 cases, and they all recovered without the aid of any internal medicine or stimulants. This vapour was the only disinfectant he used, it was confined to the bed by a canopy and screen of sheets; and no infection occurred from the cases under his care.

Dr. Jules Simon deprecates the use in this disease of chlorate of potash, borax or mercurials, but advocates the application every hour of a mixture of infusion of eucalyptus leaves, salicylic acid and glycerine. He also recommends the use of the eucalyptus spray, and he keeps the patient in an atmosphere rendered moist and disinfectant by heating over spirit lamps, shallow tin dishes, some containing tar, others eucalyptus leaves and water.

The cases treated by myself and my son with the eucalyptus disinfectant have been perfectly successful; the membrane cleared away in from one to three days and it did not reform. The disinfectant was rubbed over the chest and throat and sprinkled over the pillows and sheets for the purpose of saturating the air around the patient with its vapour. This should be done every three or four hours, that he may continually breathe air so saturated. If the room be large or if the patient be in the ward of a hospital the bed should be surrounded by a canopy and screen of sheets. In cases so treated there will be no spread of the infection.

It must be borne in mind that when a case of diphtheria

occurs in a house, the source of infection is to be found in the dust-hole, the tank or the drains, and other children in the house may become infected from one of these sources.

The disinfectant or an emulsion of the oil should be applied to the tonsils twice or three times a day, and if there be much mucous secretion in the throat and nostrils, one teaspoonful of the emulsion should be mixed with four ounces of warm water and the throat and nostrils syringed with it.

Cases of measles and chicken-pox should receive inunction twice a day for three days, then once a day for the succeeding five days, and the air of the room kept well saturated with the vapour of the oils. The cough and any complication of measles should be treated in the usual manner, but chicken-pox requires no other treatment. The inunction prevents all infection from these diseases. I have known measles to disappear after one inunction and other children in the family to escape infection, and in one family measles was on two occasions confined to one member, by the use of the disinfectant in the room, and without inunction.

In whooping cough it is not possible to check the infection from spreading by the use of this or any other disinfectant, as children suffering from this disorder are not confined to their bed or their room, and therefore cannot be kept under its influence, but as long as they are confined to their room the infection can be arrested.

I have found that by using the eucalyptus spray or disinfectant on the pillows of children with whooping cough their fits of coughing become less frequent and less severe. During the day I advise the use of a small bag of cotton wool or wood wool to be suspended on the chest, by a ribbon around the neck, and saturated with eucalyptus disinfectant, using a teaspoonful of it three times a day; in this way the patient continually breathes its vapour. Ten to thirty drops of the emulsion should likewise be administered three times a day.

Dr. Hardwicke, of Dovercourt, in a communication to the

Lancet, of Nov. 2nd, 1889, says :—" During an epidemic of whooping cough which occurred last year in this district I was induced, by the continual failure of the various popular remedies to try the affect of the oil of eucalyptus. "He used a spray of eucalyptus and terebene "half an hour before each meal and at bed-time," and gave terebene in one-drop doses. "In every case " he says, "where the above treatment has been properly carried out, I have effected cures in about a fortnight."

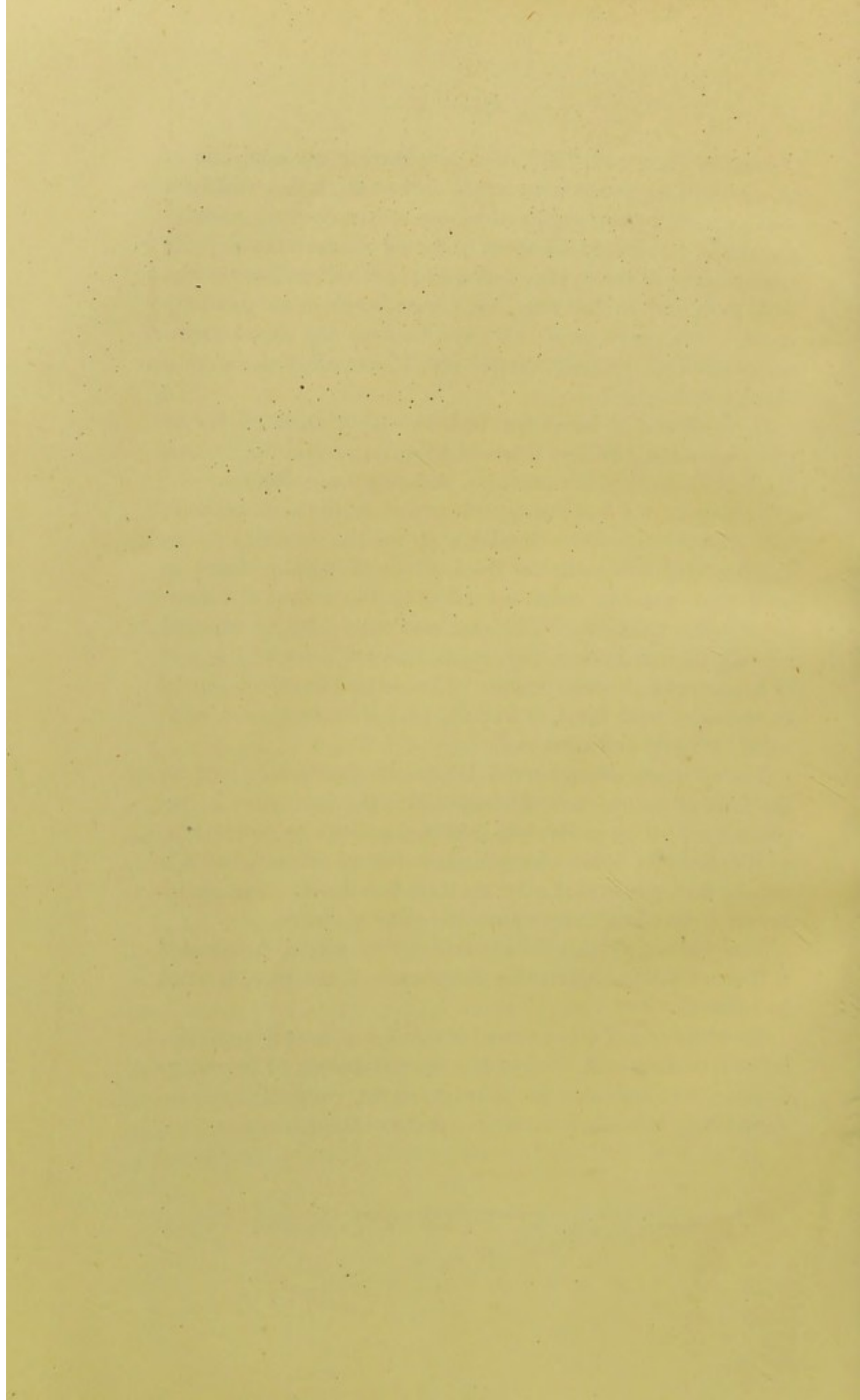
In small-pox I have not had an opportunity of trying eucalyptus but I believe it would prove successful in checking the development of the pustules, and stopping infection.

Neither have I had an opportunity of trying it in typhoid, but should advise the emulsion (1 to 12 strength) to be administered internally in from 10 to 60 minim doses in sweetened water or milk, according to the extent of toleration by the stomach. The emulsion may also be injected into the rectum twice a day, using one tablespoonful to one or two ounces of warm water. The bed and the room should be sprinkled with the disinfectant, and inunction used each night, or night and morning.

The oil when administered internally should be given in the form of emulsion and sweetened; the dose must be regulated according to the power of the patient to tolerate it, as it creates in some cases more or less of nausea, but it is usually better tolerated after the first few doses. The globulus oil creates less nausea than the other varieties.

The vapour of the disinfectant when very concentrated will cause headache, but this disappears if the amount used be lessened.

Eucalyptus and other essential oils are antiseptics and disinfectants, they will destroy the specific poison of infectious diseases, but must not be relied upon for combating the inflammatory complications and sequelæ of these diseases.



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