

A further communication on the results of a bacteriological examination of the pipettes and collyria taken from a treatment case used in ophthalmic practice : with the effects of inoculations / by G. E. De Schweinitz and E. A. De Schweinitz.

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A FURTHER COMMUNICATION ON THE RESULTS
OF A BACTERIOLOGICAL EXAMINATION OF
THE PIPETTES AND COLLYRIA TAKEN
FROM A TREATMENT CASE USED
IN OPHTHALMIC PRACTICE,
WITH THE EFFECTS OF
INOCULATIONS.



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[Read March 7th, 1894.]

AT the meeting of the College of Physicians, April 3, 1893, we presented a preliminary communication upon the subject contained in the title,¹ and the results which were reached are summarized in the following tables which are here reproduced.

The examination had not gone sufficiently far at that time to plate the cultures and separate the organisms which were present in the lotions and pipettes. The termination of this research is as follows :

The cultures given, both by the cocaine pipette and cocaine solution, were found to contain the *micrococcus aquatilis*, the *bacillus liquefaciens*, and the *proteus vulgaris*. In addition, the *bacillus of Vignal* was detected, which must have been an accidental and unusual contamination.

¹ In this paper the previous work in this line of research was reviewed.

PIPETTES.

Unused pipette.	No growth.		
Cocaine pipette.	Growth on potato, agar-agar, and beef-broth.	Same germs as those found in cocaine solution; inoculation caused purulent irido-choroiditis.	Rubbing abraded cornea with culture produced moderate ciliary injection and slight clouding of cornea.
Fluoresceine pipette.	Growth on potato.	Inoculation caused slight iritis.	
Atropine pipette.	No growth.	Pipette had been frequently cleansed with sublimate lotion.	
Pyoktanin pipette.	No growth.		
Homatropine pipette.	No growth.		
Eserine pipette.	Growth on all three culture media.	Slight iritis caused by inoculation, which speedily disappeared.	
Boric acid pipette.	No growth.	This pipette had often been cleansed with sublimate after use.	

FLUIDS.

Boric acid lotion.	Active growth on all three culture media.	Inoculation into anterior chamber produced purulent irido-choroiditis.	Rubbing abraded cornea with culture produced moderate ciliary injection and slight clouding of cornea.
Atropine lotion.	No growth at first; 1 month later active growth.	The growth, a fungus, was not used in inoculation, as it was of same nature as that obtained from the fluoresceine dropper.	
Homatropine lotion.	Growth on all three culture media.	Inoculation produced slight iritis, which disappeared in fifteen days.	
Cocaine lotion.	No growth at first; 2 months later active growth on all three culture media.	Inoculation produced purulent irido-choroiditis.	Rubbing abraded cornea with culture produced moderate ciliary injection and slight clouding of cornea.
Fluoresceine lotion.	Fungus growth on agar-agar.	Not used in inoculation; growth same as from dropper.	
Bichloride lotion.	No growth.		
Nitrate of silver lotion.	No growth.		
Eserine lotion.	No growth.		

The boric acid solution contained the same germs as those found in cocaine, with the exception of the bacillus of Vignal.

The atropine lotion, which, when first examined, showed no growth but later a fungus, contained two months after the first examination the *micrococcus prodigiosus* and the *bacillus liquefaciens*.

The homatropine lotion contained the *bacillus liquefaciens* and a fungus.

At the first examination the eserine pipette produced a growth on three different culture media, but the solution of the drug appeared sterile. Two months later the same solution, although tightly corked, showed a marked fungus growth (*aspergillus glaucus*). The *bacillus liquefaciens* and *bacillus implexus* were also present.

Inoculations into the eyes of rabbits with the individual cultures were made in the same way as in our previous experiments, namely, one-tenth of a cubic centimetre of an emulsion of the surface growth upon agar in the water of condensation, was injected, with all proper precautions, into the anterior chamber by means of a syringe. The daily appearances of the rabbits' eyes were exactly the same as those detailed in the first research, and need not be repeated.

The injurious effects of the inoculations from the cocaine and boric acid solutions, which were the same in both cases, were due to the *bacillus proteus vulgaris*. The *bacillus liquefaciens* produced an iritis, or more properly, a hyperæmia of the iris, which disappeared in a week.

The *micrococcus prodigiosus* from the atropine solution produced the same effect, namely, a purulent iritis, while the *bacillus liquefaciens* caused a moderate iritis or hyperæmia.

An inoculation of the culture of the *bacillus implexus* obtained from the eserine solution caused a purulent inflammation, while the *bacillus liquefaciens* obtained from the same source provoked only a moderate hyperæmia of the iris.

As has several times been shown by observers, and as we have chemically proven, an eserine solution which contains the fungus growth no longer responds to the characteristic tests

for eserine. Francke has found that solutions of atropine and eserine, sterile at first, after standing for some time become contaminated, even if the bottles have been carefully corked. The germs appear to get in at the sides of the stoppers. This, it will be remembered, was the experience in our experiments.

It becomes evident, then, that the following organisms are liable, sooner or later, to infest solutions of the alkaloids used in ophthalmic practice, namely, the *micrococcus aquatilis*, the *bacillus liquefaciens*, the *proteus vulgaris*, the *micrococcus prodigiosus*, the *bacillus implexus* (perhaps the *bacillus of Vignal*), and various fungi, particularly the *aspergillus glaucus*. Of these organisms the *proteus vulgaris*, the *micrococcus prodigiosus*, and the *bacillus implexus* introduced into the anterior chamber are capable of producing a purulent inflammation of the iris, cornea, and deeper coats of the eye. Exactly similar inoculations with the *bacillus liquefaciens* resulted in a hyperæmia of the iris, possibly a slight iritis, which disappeared in a week. The *micrococcus aquatilis* had no effect.

The growth of fungus in these solutions appears to have little deleterious effect upon the eye, but, as already noted, has the power, with eserine, at least, of changing its chemical composition. As shown in the first research, these organisms when inoculated upon an abraded cornea, the anterior chamber not being open, produce a moderate amount of ciliary injection and clouding of the corneal structure, but did not in any of our experiments call into existence a purulent inflammation of the eye.

It is unnecessary to repeat the methods of properly sterilizing alkaloidal solutions. These were summarized in the first paper, and have been published many times previously. Perhaps the most ingenious device for this purpose is the one introduced by Dr. Stroschein, of Würzburg.¹

¹ It may be stated that the experiments were performed in the laboratory of Dr. E. A. deSchweinitz, and that the separation of the micro-organisms and the inoculations are entirely his work. We are indebted to Dr. William M. Gray for preparing the slides which showed the lesions of an extensive purulent irido-choroiditis, both in the present and previous research.



