

tally is rotated until it is dry. A second dipping and drying is advisable.

The electrode vessel may be of any type; but in general a flow past the electrode is desirable. A very useful form is one in which is incorporated a thermocouple as a means of measuring the temperature at the electrode.

The equations of state derived from theoretical considerations may be verified experimentally. The preliminary variations of the electromotive force are due to diffusion only and equilibrium is reached in approximately 3 minutes, the actual time depending upon the thickness of the membrane and the amount of quinhydrone deposited. By equilibrium is meant a value within one millivolt of the true equilibrium value.

The diffusion rates of quinone and hydroquinone through the collodion membrane are practically identical so that there is a gradual loss of the solid quinhydrone without important disturbance of the quinone-hydroquinone ratio.

The electrode is stable in such fluids as whole blood where the usual electrometric methods fail, the membrane protecting the electrode system. Excellent results may be secured with the electrode in whole blood in experiments running for one half to one hour. Where it is important to maintain a constant partial pressure of gases above the solution this electrode is convenient inasmuch as it may be incorporated in a closed system.

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Etiology of Acute Upper Respiratory Infection, (Common Cold).*

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In 1914, Kruse¹ reported that he was able to reproduce the common cold in human volunteers by introducing into their nasal passages small amounts of Berkefeld filtrate of the nasal secretions from individuals suffering from natural colds. This observation

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¹ Kruse, *München Med. Wchnschr.*, 1914, **61**, 1547.

has been confirmed by Foster² and by Olitsky and MacCartney.³ Dochez, Shibley and Mills⁴ have been able to infect apes by means of intranasal inoculations of Berkefeld V. filtrates of the nasal washings from natural human colds. However, in all positive experiments a gram negative anaerobic bacillus of the type described by Olitsky and Gates,⁵ was cultivated from the Berkefeld filtrates. In a later report Shibley, Mills and Dochez⁶ stated that they had been unable to infect apes by means of intranasal inoculation of filtrates of nasal washings from healthy individuals, although the majority of these filtrates contained gram negative anaerobes of the type described by Olitsky and Gates. These findings led them to believe that the type of upper respiratory tract infection under consideration was caused by filterable virus. Recently Shibley and Dochez⁷ have described an upper respiratory tract infection in man, which followed the intranasal inoculation of filtrates of the nasal washings from natural human colds.

However, as has been pointed out by Olitsky and MacCartney and by Dochez and his associates, the Berkefeld V. and N. filtrates of the nasal washings from colds frequently contain minute filter-passing bacteria. Thus, while it has been demonstrated that the infectious agent of the common cold will pass the Berkefeld V. and N. filters, the question whether the filter-passing anaerobes constitute the infectious agent, or whether it is a true filterable virus, has not been definitely settled.

Recently we have attempted to transfer colds to healthy young women volunteers, by means of filtrates containing the filter-passing anaerobes and by means of bacteria-free filtrates. These volunteers were placed in strict isolation and every precaution was taken to protect them from sources of natural infection. The experiments were carried out during the months of June and July, 1930, in which period the incidence of colds in Baltimore was at a low level.

The nasopharyngeal washings were obtained during the first 48 hours of the natural colds. Half of each washing was filtered through a Berkefeld V. candle and in every instance the filtrates contained filter-passing anaerobes. The other half of the washing

² Foster, G. B., Jr., *J. Am. Med. Assn.*, 1916, **66**, 1180.

³ Olitsky, P. K., and MacCartney, J. E., *J. Exp. Med.*, 1928, **38**, 691.

⁴ Dochez, A. R., Shibley, G. S., and Mills, K. C., *Proc. Soc. Exp. Biol. and Med.*, 1929, **26**, 562.

⁵ Olitsky, P. K., and Gates, F. L., *J. Exp. Med.*, 1922, **36**, 501.

⁶ Shibley, G. S., Mills, K. C., and Dochez, A. R., *Proc. Soc. Exp. Biol. and Med.*, 1929, **26**, 59.

⁷ Shibley, G. S., and Dochez, A. R., communication to the Soc. for Clin. Invest., Atlantic City, May 5, 1930 (unpublished).

was filtered either through a small improved Seitz filter (Uhlenhuth model) or through a Berkefeld W. candle, and all attempts to demonstrate aerobic or anaerobic microorganisms in these filtrates by means of improved culture methods have been without success.

After a preliminary period of isolation (to preclude the chance of a natural infection arising), the subjects were inoculated intranasally and the pharynx was swabbed with small amounts of the same filtrate. In the first group of experiments, 10 volunteers were inoculated, half of them receiving Berkefeld V. filtrates and the other half Seitz filtrates. Two subjects from each group developed colds. From one of those developing a cold subsequent to the inoculation of Berkefeld V. filtrates, serial passages were made through 2 subjects by means of Seitz filtrates. In a second experiment successful serial transmissions were accomplished through 3 individuals by means of Seitz filtrates and the infection was carried through a fourth passage by means of Berkefeld W. filtrates. All volunteers were examined, both before and after inoculation, by independent observers.

To recapitulate: Of 5 individuals inoculated with Berkefeld V. filtrates of the nasopharyngeal washings from natural colds, 2 developed colds. Nine of 15 individuals inoculated with Seitz or Berkefeld W. filtrates of nasopharyngeal washings from acute colds, developed colds. Serial transfers through 2 and 4 individuals respectively, have been accomplished by means of Seitz or Berkefeld W. filtrates. All of the Berkefeld V. filtrates contained filter-passing anaerobes, while in all instances both aerobic and anaerobic cultures from the Seitz and Berkefeld W. filtrates remained sterile. These findings confirm and extend the observations of Kruse, Foster and of Dochez and his associates, that the infectious agent of acute upper respiratory infection (the common cold) is a filterable virus.

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Stillbirths in a Mouse Interspecific Cross
(*Mus musculus* x *Mus bactrianus*)

C. V. GREEN. (Introduced by C. C. Little.)

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Reports of species crosses among rodents have been infrequent in the literature and in most of these only small numbers were involved.