merely sop up the poison. After doing this, say, thirty times, rub well with the wet cotton before throwing away each time. Finally rub with the alcohol and cotton very vigorously to get the dissolved poison out of the "pores" of the skin. If small blisters have already formed from the poison the hard rubbing will break them and the contained poison will then be more readily removed.

Do not sop or rub more than a few moments with each bit of cotton, but throw it away almost at once. Allowing the alcohol to dry merely redeposits the poison on the skin and tends also to spread it. Do not use the same swab for repeated dipping. Throw each away at once. One hundred such pinches of cotton is enough to treat, say, two patches of poison each as big as a silver dollar. More extensive poisoning merely calls for more extensive treatment with more swabs.

This treatment is completely effective in all cases in which I have seen it tried promptly. I have not seen it tried in old cases of severe poisoning. I have never known other treatment, potassium permanganate, juice of *Impatiens fulva* or the dozens of commonly recommended "remedies," to do any recognizable good. Logically, washing the hands repeatedly in *many changes* of very strong soapsuds should remove some of the oil and throw it away, but it is seldom, if ever, carried out effectively, and at its best is far less effective than alcohol.

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OCT. 30, 1931

SCIENTIFIC APPARATUS AND LABORATORY METHODS

TESTING THE REACTION OF DISTILLED WATER

IN talking to various scientific workers, the writer has found that a considerable number of them have the idea that pure distilled water should have a pH of 7 or near that when in contact and equilibrium with the air. Because of this erroneous conception, the writer has been prompted to write the following note of explanation.

Kendall,[1] on the basis of his own investigations and also those of others, concluded that the conductance of carefully purified water is due practically solely to carbonic acid absorbed from the atmosphere. Conductivity and pH measurements of distilled water taken directly from a still may be very misleading and largely meaningless, because under these conditions the content of carbonic acid may vary, depending upon the method of distillation, the temperature at which the water comes from the still and duration of exposure. Unless distillation takes place from an alkaline solution, or other special provisions are made, and the distillate is in all cases properly protected, there is bound to be carbonic acid present in the water. For most purposes, it is folly to go to the trouble of distilling in such a way as to remove the carbonic acid, because it will be quickly absorbed again during ordinary storage or usage of the water. Johnston[2] states that it takes only about ten minutes for unstirred water in an open beaker to come to equilibrium with the carbonic acid of the air. Since most of our experimental work involving the use of distilled water is carried on in a manner which permits contact of water with the air, it should be recognized that the water in these cases dissolves carbonic acid in accordance with the partial pressure of the carbon dioxide in the atmosphere.

On the basis of Kendall's conductivity measurements already mentioned, pure water at a temperature of 25° C. in equilibrium with the atmosphere has a pH of 5.7. A test by Kendall,[3] with the indicator method of water under similar conditions, gave a pH of 5.8. Ordinary and even considerable changes in the temperature of water, causing changes in the amount of carbonic acid dissolved, influence the pH of the water but little, due to a compensation in degree of ionization of the carbonic acid which takes place. Using the indicator method, the writer has found pure water, when in equilibrium with the atmosphere, to have a pH of 5.6 to 5.8. This, as will be noted, checks remarkably well with Kendall's measurements already referred to. Laboratory air sometimes contains enough more carbonic acid to materially change the pH. The pH is, of course, also influenced by various impurities which are present in air in greatly varying amounts. The amounts of ammonia and various acids in laboratory air are often high enough to change profoundly the pH of water exposed to it. Ammonia is often present even in outdoor air in sufficient amount to affect the pH of water. During a rain or snow, this ammonia is largely washed out, and a noticeable change in the pH of water in equilibrium with the air before and after a rain or snow can often be detected with the indicator method to be described. This change is especially marked during periods of infrequent precipitation.

Neutral brom cresol purple is an excellent indicator for testing the pH of distilled water. To make the

[1] J. Kendall, *Jour. Am. Chem. Soc.*, 38: 1480–1497, 1916.

[2] J. Johnston, *Jour. Am. Chem. Soc.*, 38: 947–975, 1916.

[3] J. Kendall, *Jour. Am. Chem. Soc.*, 38: 2460–2466, 1916.

test, place about 5 cc of the water in a test tube and add 5 drops of the 0.04 per cent. indicator solution. Now, pour the water back and forth from one test tube to another for a minute or two, so that the water may come to complete equilibrium with the carbonic acid of the air, and then compare with proper standards. If the water is of good quality and the air is of average outdoor purity, the water should assume a pH of 5.6 to 5.8. If the pH is higher than this, it is a good indication that either the water or laboratory air contains appreciable amounts of ammonia. On continuing to pour back and forth for some time there may be a gradual rise in the pH, due to slow but gradual absorption of ammonia. The water comes to equilibrium with the carbonic acid of the air very much more rapidly than with the ammonia, so that, usually, the factor of ammonia in the air may be ignored. It may, however, be desirable to repeat the test at an open window or door or even entirely outdoors. At times even outdoor air contains sufficient ammonia to appreciably affect the test. The test is so extremely sensitive that it is easily possible to detect the difference in the ammonia content of air before and after a rain or snow.

The test may also be made in the complete absence of carbonic acid and ammonia by bubbling a current of air, purified so as to be free of these gases, through the test solution. The pH of good water under these conditions should approach near 7. For most purposes, however, it suffices to make the test after allowing the water to come to complete equilibrium with the air and recognizing that under these conditions pure distilled water has a pH of 5.6 to 5.8.

It is important to emphasize that pure water has practically no buffer capacity and that minute amounts of impurities may be sufficient to markedly alter the pH of it. In making conductivity tests of water, the same principles should be followed as in pH tests, namely, the water should either be in complete equilibrium with the air, or else carbonic acid and ammonia should be completely removed and excluded during the tests, and the results interpreted accordingly.

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A METHOD OF COPYING KYMOGRAPHIC RECORDS

The physiologist or pharmacologist who during the course of a year accumulates a hundred yards or so of kymographic records must often wish, especially when he starts to write a paper, that he had in some way secured copies of those parts which are particularly convincing and illustrative, and had filed these under appropriate headings.

It is not always convenient to cut up the original records, and usually it will be found best to file in one place all the tracings made during several hours of experiment on one animal. Yet during that time several different phenomena may have been observed, several different experiments may have been tried, and several drugs may have been administered.

Many years ago it occurred to me that the cheapest method of obtaining a copy would be to make a print on fast bromide paper, using the smoked tracings as a negative. The method is so simple that it does not seem likely that I could have been the first to think of it, but I can not remember ever having heard of any one who used it. If the kymograph paper is well and evenly smoked and not handled overly much by greasy fingers the copy may be more clearcut and better suited for publication than is the original.

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APPARATUS FOR OBSERVATION OF A SMALL OBJECT WHILE FLOODED WITH VARIOUS SOLUTIONS

In attempts to study the effects of various solutions upon individual nematode ova and coccidia, need has been felt for an apparatus which would allow continuous observation of an individual object before, during and after it was subjected to the action of chemical solutions. Following is a description of such an observation cell which has proved to be very satisfactory for this purpose:

Two small trough-like depressions, (A, A′), about 0.4 mm deep are ground into the surface of an ordinary microscope slide. This is quickly done by hold-

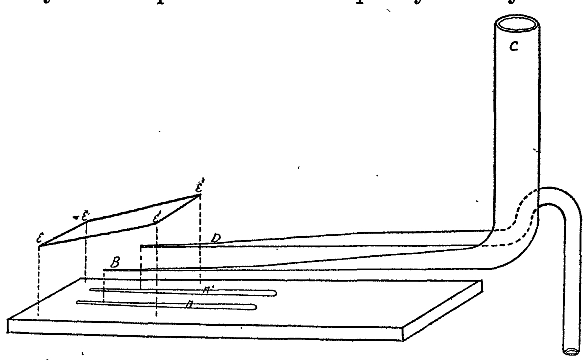

Fig. 1

ing the surface of the slide against the edge of a small carborundum wheel. Next, a glass tube of approximately 5 mm in diameter is heated and a portion drawn to a diameter of about 0.5 mm, while at the same time the portion of the tube at the constriction is bent to form a right angle. The smaller portion of the tube (B) serves as the inlet to the observation