ARTICLE III.—*On the Mode of Testing the Presence of Minute Quantities of Alcohol.* By ROBERT D. THOMSON, M.D., Lecturer on Practical Chemistry in the University of Glasgow.

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THE determination of the presence of minute quantities of alcohol is a chemical point of some importance, especially in judicial cases. The usual method hitherto adopted for detecting alcohol in mixed fluids, is to subject the fluid suspected to contain it to distillation at a temperature not greater than that which is required to cause the alcohol to pass over into a receiver, and then to judge of the presence of spirit by the vinous odour of the distilled fluid. When alcohol in the form of gin, whisky, or brandy, &c., has been swallowed, if death takes place within a short period of the introduction of the fluid, the odour of the spirituous liquors will be distinctly perceptible to one inspecting the interior of the stomach; but if a considerable time should elapse, as, for example, a few hours between the introduction of the spirit and death, it is rarely found that the smell can be detected. Again, if the person should die under the influence of spirituous liquors, and the stomach were not examined within a limited period, the odour of alcohol might not be perceptible, since as absorption goes on for several hours after death, and as volatile fluids appear to be peculiarly susceptible of rapid absorption, the whole of the alcoholic fluid might be removed from the intestinal canal into the circulation. It has been affirmed that alcohol has been detected in the brain of gin drinkers; but as the mode of testing adopted was merely the impression made upon the nerves of smell, we may perhaps be allowed to doubt the accuracy of the experiment. It has been affirmed that the gin obtained from the brain has been inflamed; and if this were correct, we should then be entitled to quote nasal and ocular proofs of the presence of alcohol in the brain; but as the gin of the shops is so weak—that in its natural state it will scarcely burn—we may also be permitted to be sceptical in reference to this second proof. These views do not tend to disprove the possibility of the presence of alcohol in the vessels of the brain and other portions of the body, because we know that hydrocyanic acid passes to the very extremities of the body, and can be distinctly detected by its odour, until it has either been removed from the system by the combustion of respiration, or simply by exhalation from the lungs. Now, alcohol and hydrocyanic acid are somewhat analogous in a chemico-physiological point of view, as they possess a powerfully sedative effect upon the system, are exceedingly volatile, readily absorbable, and require much oxygen to resolve them into simpler forms. For these reasons it appears highly probable that alcohol

may be capable of detection in the vessels of the system when it has been swallowed in large quantities. The experiment could only, however, be made on the inferior animals, and we should require some more definite test than the mere smell of the alcohol. There are other circumstances, in a judicial point of view, in which it may be of importance to detect minute quantities of alcohol. For example, to distinguish small portions of the liquid preparations of opium. In medicine there are used the solution of opium in alcohol; the solution of opium in wine; the solution of opium in alcohol with benzoic acid and ammonia; the solution of opium in vinegar; and lastly, the solution in water. When these preparations are entire, there is not so much difficulty in their discrimination, but if they have been exposed to the air, much of the alcohol escapes, and they may all become analogous to a solution of opium in water. To distinguish those which contain alcohol from those which do not, enables us to divide them into two classes, and thus to simplify the inquiry. For these, and many other cases where minute detection is necessary, I have been in the habit for some years of employing a method which depends upon a well-known fact, the dehydrogenation of alcohol by means of oxygen. For this purpose the fluid to be tested, if coloured, or a mixed one, is to be distilled in the water bath until one third of it passes over. Should the liquor contain any acetic acid, this may be saturated previous to distillation with carbonate of soda, in order to remove the vinegar smell, which might interfere with the odour of the subsequent test. Into the distilled liquor supposed to contain alcohol, should be dropped a crystal or two of chromic acid, and the liquor stirred. If the smallest quantity of alcohol is present, the green oxide of chrome will begin to be disengaged, and at the same time the smell of aldehyde is distinctly perceptible.

The production of aldehyde from the alcohol depends on the separation of oxygen from the chromic acid, its union with the hydrogen of the alcohol, and their consequent removal in the form of water; the formulæ for the two bodies being—

By means of this simple test it is possible to distinguish a drop of alcohol in half an ounce, and even in an ounce of water. When chromic acid is not at hand, the experiment may be made with bichromate of potash and sulphuric acid. This, perhaps, affords the most distinct method of performing the experiment, and may be conducted as follows. Drop in a few grains of powdered bichromate into a small flat glass (which tapers towards the bottom) containing the solution to be examined, and add a few drops of oil of vitriol. If alcohol is present the green oxide will be observed to be developed on the surface of the undissolved salt, and the cha-

characteristic odour of aldehyde will speedily be perceptible. As an instance of the utility of this test it is only necessary to give one illustration. Some months ago I had sent to me by Dr Joseph D. Hooker, a bottle containing seven cubic inches of a fluid which was obtained from a species of Eucalyptus, or gum tree, in Van Diemen's Land—a fluid which is drunk by the natives as an intoxicating liquor. It possessed a powerful odour of vinegar, so powerful, indeed, that it overcame every other smell which might be present. On neutralizing it with carbonate of soda, it was found to require 28·6 grains of this salt to saturate the acid, equivalent to 10·12 grains of dry acetic acid in the whole fluid. On distilling one-third of the liquor, a fluid came over having a faint odour of foreshot. When chromic acid was added to it, or bichromate of potash and sulphuric acid, the liquor became green, and the odour of aldehyde was powerfully evolved. This proved the presence of alcohol. On evaporating the liquor in the retort, a small quantity of sugar and needle-shaped crystals remained. The latter when treated with sulphuric acid, gave out a strong odour of acetic acid. These were satisfactory proofs that the Eucalyptus sugar is capable of fermentation, and that the alcohol produced from it is convertible into acetic acid, facts which show us that the Australian sugar is not manna or peculiar, but common sugar.

ARTICLE IV.—*Rubeola among the North American Crees.* By WILLIAM SMELLIE, M.D., H.H.B.C.S.

It has often been observed that, among uncivilized nations, epidemic diseases are in general much more fatal than in civilized society. The cause of this forms an interesting subject for investigation, and would still appear to be in a great measure unexplained. The most obvious reason, and one which will first present itself to any one who looks into the subject, will appear to be the difference in the habits of the former, their prejudices, and their neglect or ignorance of that salutary care which seems indispensably necessary to protect the susceptibility of the system from dangerous complications. This in many instances may go a great way to account for the fact, but there would still appear to be some other causes which are not so easily explained. The following details, I think, will go far to shew that this conjecture is not without reason:—

Rubeola has during the past Summer ravaged the Territories of the Hudson's Bay Company throughout the northern department, and decimated the Indian population. It was introduced into Red River Settlement from the United States during last Spring, and as soon as the river navigation was opened in the Summer, rapidly diffused itself throughout the more northern districts. However, it is only with the epidemic as it occurred at Fort York that I am