which inaccuracies in the potassium iodide method of estimation, namely, the interference of sulphur dioxide and serious loss of iodine by volatilisation, were overcome by first removing the former, and then allowing the ozonised air to react on potassium iodide in the presence of a known volume of N/Ioothiosulphate solution, which fixes the liberated iodine. The apparatus used will be described later, together with the general results.

The measurements form two series, determinations of the sulphur dioxide and nitrogen peroxide in dilute sodium bicarbonate, alternating with those of ozone, sulphur dioxide, and ammonia. Each test proceeds for about three days, and is conducted in duplicate at the village of Upminster, Essex (17 miles E.N.E. of Charing Cross), and at Messrs. Jeyes' laboratory, Plaistow, E., 5000-10,000 litres of the outside air in each case being examined. The former estimation was in progress during the storm at both places. Upminster lay on the eastern fringe of the storm track. It experienced severe lightning, but only 0'36 inches of rain fell there, as against 2 inches at the London station, which was nearer the centre. The proportion of nitrogen peroxide before, during, and after the storm (recorded in terms of 1 volume of NO₂ in . . . million volumes of air) was as follows :—

Before. During. Since.

London. . . I in 120 millions. I in 114 millions. I in 134 millions. Upminster . . I in 350 millions. I in 440 millions. I in 400 millions.

There was, therefore, no appreciable increase in nitrogen peroxide in the air during the storm. The sulphur dioxide and ammonia remained practically constant during the above period, the proportion of the former being—London, I in 20 millions, Upminster, I in 45 millions, while the ammonia amounted to I in 200 millions in both.

This result has been confirmed by an examination of rain water. I have not yet collected during a thunderstorm a specimen of London rain sufficiently free from suspended particles (which completely mask its analysis) to be trustworthy; but in a bright sample collected during a thunderstorm at Upminster, the nitric acid content proved to be equivalent to a N/200,000 nitric acid solution, which is slightly under the average of several samples collected during still conditions.

The proportion of ozone present a few days before the storm was 1 in 23 millions in London, and 1 in 22 millions at Upminster, but the average amount present between July 13 and 16 was 1 in $3\cdot 2$ millions in London, and 1 in 14.8 millions in the country. There was, therefore, more than seven times the previous quantity of ozone present in London air three to six days after the storm, and the proportion must have been appreciably higher than this at the time, owing to the subsequent loss by diffusion and convection, and to the change into oxygen, which can be readily proved to occur. A fortnight later the proportion of ozone at both places was 1 in 18.5 millions.

Confirmation of the above results has been obtained during a much less spectacular thunderstorm, which visited both stations about midday on August 24 last. A few days previously the proportion of ozone found was—London, I in 22.7 millions, Upminster, I in 18.8 millions. Measurements of the ozone had been in progress nearly twenty-four hours when the storm occurred, and were continued for the next three days. The average content for the four days was—London, I in 9.71 millions, Upminster, I in 7.8 millions, the proportion of ozone having thus been more than doubled in each instance.

I hope to devise a portable modification of the apparatus that will enable estimations to be completed in two or three hours, in which case much more

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detailed information on the subject will be obtained than is possible in three- to four-day averages. WILLIAM C. REYNOLDS.

"Wharfedale," Upminster, Essex, August 28.

A Method for Demonstrating the Stages in the Life History of Monocystis in Practical Class Work.

In the text-books on practical zoology in common use in zoological laboratories, the method advocated for making preparations of the contents of the vesiculæ seminales of the earthworm for the examination of the stages in the life history of Monocystis is what is usually known as the cover-glass method (*vide* Marshall and Hurst, "Practical Zoology," 9th edition, p. 13). It is, I believe, a matter of common experience that, when this method is adopted, only a small percentage of the students succeed in finding in their own preparations all, or even the majority, of the important stages. Generally only the trophozoite and sporocyst stages are found, and demonstration specimens have to be resorted to to fill in the gaps.

This repeated failure in previous years suggested the trial of a modification of the method, and the result may be of interest to those who have charge of practical classes. The preliminaries are the same. The vesiculæ seminales (preferably the posterior lateral vesiculæ seminales, as these appear to contain more specimens) are removed from a freshly killed (with chloroform) worm, and placed in a watch-glass with about five to six times their bulk of normal salt solution. The material is teased thoroughly with needles. A drop of the fluid and particularly a portion of the teased wall of the vesicula seminalis is placed on a slide and, if desired, faintly stained with Dahlia. Cover with a cover-glass, and the preparation is ready for examination. If the operation has been Dahlia. rapid and the staining only slight, the trophozoites will be found to be still alive and exhibiting the characteristic gregarine movement. The encysted stages will be found embedded in the tissue of the wall of the vesicula seminalis, and it is for this reason that stress should be laid upon the inclusion of a portion of the wall in the preparation. In this situation the stages which are not usually found, i.e. the gametocytes in association, and more rarely gametocytes showing fragmentation into gametes, occur, as well as large numbers of sporocysts containing spores.

Below is a summary of the results (as recorded by the students themselves) obtained with a class of twenty students, one worm serving for every two students. The class was held in May.

Stages.				Percentage of Students obtaining Stages.			
Trophozoite.						85	
Gametocytes in	ass	ociat	ion			60	
Gametocytes sh	owin	ng fra	gme	ntat	ion		
into gametes		•				25	
Sporocysts with	n spo	ores				95	

As experience shows, worms vary considerably in the extent to which they are infested with Monocystis, but the above result may be taken as representative.

It may be of interest also to record that the worms used by the class had been kept in the laboratory from the previous November. The method adopted was to keep them in a tank in a compost made up of one third earth and two-thirds moist leaf-mould. The compost must be kept reasonably moist, and it was found advantageous to change it about every three weeks. A. J. GROVE.

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August 21.