

of the West Riding Rivers Board. Various observations on the organisms of clean and polluted waters are being carried out by members of the Yorkshire Naturalists' Union, and an exhibit embodying some of the earlier results of these two lines of attack was shown during the British Association meeting at Hull in 1922. Something, therefore, has been done, largely by private enterprise, and further co-operation would doubtless result in much more being effected.

Emphasis is laid on the fact that pollution and recovery from pollution are likely to take place undetected in fresh water. This may be the case in estuaries or in rapid streams, but in lakes and even in slow streams, recovery from many types of pollution seems to be very slow. Particularly in lakes, the danger of the early stages of pollution appears to lie in the fact that they are relatively irreversible. In several of the English lakes, mining operations have been particularly harmful, even though nothing more has happened except the washing of ore detritus into the lakes. This produces no immediate effect, but the silts gradually blanket the shores and destroy the natural feeding grounds of trout. The deposited silt fosters a luxuriant vegetation, and the biological character of the lake is completely changed. The flora and fauna is actually more luxuriant, but the net result in terms of fish, is to replace trout (and char) by perch and pike. Once such a change has taken place, the experience of the Windermere conservators seems to suggest that, in large sheets of water, very great difficulty will be experienced in restoring the original preponderance of trout, and a permanent deterioration in the value of the fisheries thus results. Somewhat similar results are produced by the discharge of sewage effluents into lakes. These types of contamination tend to be overlooked because the harmful effects produced are very gradual and rarely catastrophic. The effects are, however, very persistent and of great importance.

The position of freshwater biology in Great Britain is curious and depressing. Much has, at different times, been accomplished through private generosity and enthusiasm. At present, we stand almost alone among the nations in possessing no laboratory facilities for carrying on the work. The studies carried on at the marine laboratories show what might be attempted if means were available, and it is to be hoped that the whole question will receive further ventilation.

W. H. PEARSALL.

The University, Leeds.

MAY I add my voice to those of Dr. Orton and Prof. Lewis as expressed in their letter on this subject in NATURE of February 16, and more especially as regards those rivers and streams which are utilised as water-supplies?

For the last eighteen months I have carried out systematic quantitative examinations of the plankton of a small stream and the two reservoirs which it supplies, and one of the outstanding facts shown by this investigation is the danger of basing any opinion, as is sometimes done, upon the examination of a single sample of a water.

It is found that there are enormous variations from week to week in the number and genera of organisms present, and furthermore there must always be considerable doubt as to whether the sample examined is representative. Two samples taken within a few feet of each other may show very material differences.

These two factors alone appear to me sufficient to justify the plea for *continuous* work, as it is only by the consideration of a continuous record that it can be determined whether the result of any given examina-

tion is representative of the usual conditions prevailing in the stream.

Apart from the more general question of pollution, such a record as regards their own waters is of considerable value to water undertakings, as it enables them to anticipate biological troubles, and these undertakings might, with very good reason, be appealed to for financial support. I would go even further and say that, in the case of undertakings dealing with surface waters, the compilation of such records, if undertaken as part of the routine of administration, would prove of very material advantage to themselves.

If the method of examination were standardised and the results recorded together as suggested by Messrs. Orton and Lewis, a very valuable body of evidence would be available for dealing with the question of general pollution, and the biological expert, when called in, would have some trustworthy data to go upon.

10 Elizabeth Place,  
Jersey.

P. A. AUBIN.

#### The Geological and Cultural Age of the Harrisonian Eoliths.

MOST archaeologists are familiar with the pieces of tabular flint—exhibiting rough flaking along one or other of their edges—which the late Benjamin Harrison found, many years ago, in and upon the highest portions of the plateau of Kent. With regard to the geological age of these specimens, though there is very good reason to suppose that the eoliths of the Kent plateau—as is the case with others found in similar situations in different parts of the country—are of a great antiquity, it is nevertheless clear that, having not yet been discovered, at these places, under any geologically datable deposit, the exact measure of that antiquity remains unknown. It is fortunate, therefore, that examples of eoliths of Harrisonian type occur in the detritus-bed beneath the Red Crag of Suffolk. These specimens exhibit, generally, much abrasion, thus differentiating them from the other, and later, sub-Crag implements with which they are associated, and indicating that they had had a long history before their arrival in the detritus-bed. It is possible, therefore, to decide that some of the implements of Harrisonian type are not younger than the Red Crag, but, at present, we do not know by how long they pre-date this deposit. It would, however, seem reasonable to suppose that these specimens must be referred to, *at least*, an early phase of the Pliocene period.

In considering the cultural age of the eoliths it is necessary to bear in mind the fact of their extremely primitive character, and that they are, without much question, the ancestral forms from which the normal sub-Crag implements were derived. When this is realised it becomes difficult to escape the conclusion that the Harrisonian specimens represent the earliest efforts of man to shape flints intentionally, and that they are separated by a great gulf of time from the earliest of the Chellean-palaeolithic-hand-axes. This view is, however, contested by the Rev. H. G. O. Kendall (NATURE, March 8, 1924, p. 362), by reason of his discovery, at various places, of implements of eolithic form, exhibiting a similar "patination," and condition to, and associated with definite palaeoliths of river-drift type.

Mr. Kendall argues, and I think rightly, that many of these eoliths are merely the rougher specimens made *pari passu* with the Chellean and Acheulean implements, but this only proves that such eolithic forms survived far into post-eolithic times, and cannot invalidate the conclusions based upon the presence of