develops a heterocyst first at e and later at d, only when growth has taken place to reduce the inhibitor to a sufficiently low level.

During our work, we found very few cases where the heterocysts formed simultaneously in a fragment. In general, it seems that in *Cylindrospermum*, filaments do not easily break from the middle region and that almost all fragments arise eccentrically on either side of a mid point between the two terminal heterocysts. The successive formation of heterocysts in a fragment containing no heterocysts is also an indication of the existence of polarity in the filament of the alga, which is itself a reflection of a gradient in the level of the inhibitor. A normal filament may have a decreasing gradient of the inhibitor starting from the terminal heterocyst to the mid point of the filament, the other half of the filament being a mirror image of this.

When fragments of *Cylindrospermum* were taken from the alga previously grown in a medium containing combined nitrogen and plated on agar medium free of ammonia, they were found to regenerate their first heterocyst only after a prolonged time, during which greater growth has taken place in them compared with the fragments grown earlier on molecular nitrogen. Presumably, by growing on combined nitrogen, the internal level of the inhibitor remained at a high level and as growth took place decreasing its concentration, the formation of heterocysts was initiated. The heterocysts appeared sequentially, however, first at one end and later at the other. This shows that the filaments whether grown on molecular nitrogen or combined nitrogen, still show polarity, that is their terminals are predetermined with regard to regeneration.

The nature of the inhibitor produced by heterocysts to control their spacing pattern is still debatable[1-5] but recent findings indicate that heterocysts are the site of nitrogen fixation[5]. Fogg's suggestion[6,7] that ammonia concentration in the filament is responsible for such an inhibition gains further ground, but it may not be the only deciding factor[1].

We have already discussed in some detail[8] how the spacing of heterocysts could be controlled in *Anabaena* in terms of the known metabolic activities of the heterocysts as well as the vegetative cells (see also, Wahal *et al.*[9] for the role of ascorbic acid). Although filament polarity is found in many blue-green algae, such as *Rivularia*, nothing is known of its nature and maintenance. In *Anabaena*, it has been shown[10] that cell division is asymmetrical and heterocyst spacing is controlled by the interaction between developing cells[11] but it is yet to be seen whether a similar situation exists in *Cylindrospermum* also.

This work was suported by a research grant from the Council of Scientific and Industrial Research, New Delhi.

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Received November 13, 1973; revised February 4, 1974.

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GENERAL

Commercial radionuclide dispensing

COMMERCIAL suppliers of radionuclides operate under stringent regulations. Most companies give specific assurances of nuclide identity and purity. Examples are the plots of γ spectra, radiochromatograms and, most important, the data sheet that specifies such things as quality, purity and radiation intensity of the specific nuclide. Unfortunately, however, the controls used by suppliers are inadequate and the technical data sheet cannot be relied upon implicity.

In support of other reports[1-3] I shall relate an experience which involved a shipment of radioiron. On arrival, the package was monitored and the γ activity was about 10% of that expected. The supplier confirmed this and explained that a technician had calculated the stock to be 28.7 mCi ml^{-1} instead of 2.87 mCi and ml^{-1} had therefore dispensed only 10% of the required volume. Despite the small volume, however, the radiation value show, on the technical data sheet was that expected for 2 mCi of ^{59}Fe (about 70 mr h^{-1}), which suggested that the number was either recalled from memory or copied from an old sheet. I stated this in a letter and the company responded with a written acknowledgment of error. The compounded errors, they explained, were because of rapid expansion and shortage of personnel. They believed that safeguards and routine controls, (which were not specified), would be effective in the future.

Eliminating the monitoring step and entering an assumed value for radiation were serious errors. Companies should enforce separate duties, so that a person who dispenses radionuclides cannot also perform assays, complete data sheets, package, monitor and authorise final release for shipment.

It seems reasonable, as a partial answer to this problem, that if readout plots of γ spectra or chromatograms of various nuclides can be supplied to customers, then automatic recordings of radiation could also be provided. Such records could be inspected by supervisors to detect nuclide deficiency or excess and then be duplicated to provide a customer copy. The production of an authentic radiation report for the sample would be of the greatest importance. This should help eliminate the temptation to take short cuts and to falsify reports with assumed radiation values.

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Received March 29, 1974.

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