Occurrence of the Alga *Gloeocapsa* in the Air

THE pollen and fungus spore content of the air has been investigated extensively during recent years in connexion with respiratory allergy and crop diseases. Less is known of other constituents of the air spora. The occurrence of unicellular algae in the air or in air-borne dust has been demonstrated by several investigators¹.

In quantitative studies of the air spora, we have observed the regular occurrence of a blue-green alga identifiable microscopically as belonging to the Chroococcaceae, probably *Gloeocapsa* (Fig. 1). This is a minute unicellular alga forming loose colonies on moist surfaces, either inland or on the sea-shore. The origin of these air-borne *Gloeocapsa* colonies is at present unknown; they do not appear to be lichen soredia, because most of the colonies observed were free from fungus hyphae. The mechanism by which they get into the air is also obscure.

Data are available from three centres at each of which air was sampled almost continuously during June 30–July 13, 1954, at a height of 2 metres above ground-level, using the Hirst² automatic volumetric spore trap, in which the solid particles in a measured volume of air are deposited in a continuous trace on a slowly moving microscope slide. The deposit on our slides was examined microscopically at distances along the trace corresponding to two-hourly intervals. The areas scanned provided estimates of the number of particles in 12 litres of air for each 2-hr. period. The highest concentration of the alga was observed at Thorney Island, Hants, where an average of 110 colonies per cubic metre of air was recorded over the period of observation. On the roof of the Botany Department, Imperial College of Science and Technology, South Kensington, and in an arable field at Rothamsted Experimental Station, Harpenden, Herts, the average concentration was only 1/20 of that at Thorney Island. Table 1 shows the frequency of occurrence of *Gloeocapsa* colonies in the 12-litre samples, and also the mean and maximum concentration at each centre.

Table 1. OCCURRENCE OF *Gloeocapsa* COLONIES IN THE AIR DURING JUNE 30–JULY 13, 1954

Site	No. of 12-litre samples with <i>Gloeocapsa</i>		Concentration per cubic metre of air	
	Present	Absent	Average	Maximum
Thorney Island, Hants	55	95	110	803
South Kensington, London	5	134	7	100
Rothamsted, Harpenden, Herts	7	137	5	100

At Thorney Island the air-borne *Gloeocapsa* colonies averaged about eight cells each. There was a marked diurnal periodicity of occurrence: the maximum at 23.00 hr. averaged 210 colonies per cubic metre, and the minimum, between 04.00 and 13.00 hr., averaged about 30 colonies per cubic metre. Their occurrence was not obviously related to the state of the tide. At Rothamsted and South Kensington, concentrations are known to have been somewhat higher during mid-June 1954 than they were during the period described when sampling was also in progress at Thorney Island.

The concentrations recorded so far are small in comparison with those normal for pollen or fungus spores. They are nevertheless high enough at Thorney Island to indicate that air dispersal may be important

Fig. 1. Group of cells of *Gloeocapsa* type from air sampled at Thorney Island, 21.00 hr., July 6, 1954. $\times 500$ approximately

in *Gloeocapsa*. With an average concentration of about 800 cells per cubic metre of air for at least three weeks, this organism warrants further study as a potential allergen, especially as the cells of *Gloeocapsa* are embedded in a thick sheath of mucilage.

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¹ Ehrenberg, C. G., "Passat-Staub und Blut-Regen", 192 (Berlin, 1849). Salisbury, J. H., *Amer. J. Med. Sci.*, 51, 51 (1866). Cunningham, D. D., "Microscopic Examinations of Air", 58 (Calcutta, 1873). Yarwood, A. R., D.S.I.R. "The Investigation of Atmospheric Pollution", 16th Report, 11 (H.M.S.O., 1931). Rempe, H., *Pflanz.*, 27, 93 (1937). Meier, F. C., *Sci. Mon.*, New York, 40, 5 (1935). Polunin, N., *Svensk. Bot. Tidskr.*, 45, 320 (1951).

² Hirst, J. M., *Ann. App. Biol.*, 39, 257 (1952).

Seasonal Changes in Three Common Constituents of the Air Spora of Southern Nigeria

FLUCTUATIONS in the air spora have been studied in a temperate climate by Hirst^{1,2} and others. Less is known of the changes which occur in the tropics. The study of these changes is valuable in assisting the prediction and analysis of epidemics of plant disease due to air-borne fungi.

The observations described below were made at the Federal Department of Agricultural Research, Ibadan, Western Region, Nigeria. The station is at lat. 7° 23' N., long. 3° 50' E. at an elevation of 600 ft. above mean sea-level and lies on the edge of the lowland rain forest belt. The annual rainfall is 45–50 in. and typically there is a dry season from December to March and a rainy season from April to November, with a short break during the first half of August. Further details of the vegetation are given by Keay³ and of the climate by Brooks⁴.