may be due to the toxic qualities of the Oscillatoria which are suggested by the disagreeable gas that it gives off.

Periodicity in Spirogyra.

A brief consideration of the theories advanced by several botanists who have studied the question of periodicity in the occurrence and sexual reproduction of Spirogyra may serve to summarize and explain some of the results which have been noted in the foregoing pages.

Benecke[2] has advanced the theory that conjugation in Spirogyra is due to the failure of ammonium salts, supposed to be removed from the the water by angiosperms which increase in size and abundance as the season advances. He placed *Spirogyra communis* (Hass.) Kütz, in various media, in bright light, with temperatures from 12°—20° C., and found that in nitrogen-free solutions conjugation took place at once or in a short time. If parallel cultures were run, in which NH_4 or NO_3 had been added in appropriate amounts (.05%) to any of the above media or substituted for one of the constituent salts, no conjugation took place, but good vegetative growth ensued generally.

Danforth[3] repeated these experiments, using other species. Of the five species investigated, three failed entirely to give the same results as had been obtained in Benecke's work, the fourth failed in every case but one, and the remaining species, *S. Grevilleana* (Hass.) Kütz seemed to agree more closely with S. *communis*, but even here the agreement was not complete. Apparently, Benecke did not find any specific stimulus which would induce conjugation unless the absence of ammonium salts be taken as such. Danforth also found that some species of Spirogyra did not respond by vegetative growth as did others when NH_4NO_3 (Ammonium nitrate) was added to the media. *Spirogyra stetiformis*