In considering the process of reproduction, it is to be noted that the phenomena recorded during a fortunate observation in one case only cannot be regarded as typical for the entire group. It has, however, been perfectly established that reproduction can take place by means of two conjugated frustules, or by the two valves of the same frustule separating themselves so that the contents form a globular mass or sporangium, within which the formation of one or more young frustules takes place. These young forms sometimes exhibit duplication or fission, but this does not always happen, nor does it occur in all frustules. On the contrary, some species give rise to very minute frustules which in their turn form a new progeny. Thus when the endochrome occurs not in a more or less amorphous condition but as numerous rounded masses of equal size and definite outline, the frustule is to be regarded as sporiferous, the rounded masses representing so many sporules that are destined to reproduce the species. The escape of these sporules has been observed by Rabenhorst in a species of *Melosira*, by O'Meara in a *Pleurosigma*, and by myself in a *Podosphenia*, while Dr Cohn, as noted by Dr Pfitzer, saw a winged *Amphiprora* emitting small frustules from which the species could be recognised.

It is further to be borne in mind that diatomaceous sporules will gradually develop into the typical frustule either internally in the parent frustule, or externally in the sporangium. Sometimes the parent frustule takes the place of the sporangium, in other cases the sporangium is the production of the Diatom, destined for the incubation and maturation of the sporules.

These sporules are emitted in a free and solitary condition, but they are sometimes seen in couples, as in *Mastogloia*. Here each couple is enclosed in an oval cyst, and all stages of development, from two minute oblong greenish corpuscules up to large fully formed frustules, can readily be traced. All the couples are immersed in a dense gelatinous mass with which no extraneous bodies are mixed. Numerous round sporules have also been observed to form a mass, and transitional stages have been traced from the round green granular condition to that of spherical hyaline cysts which included a number of small but distinct *Naviculæ*. Among the cysts some were observed to move by means of two very slender flagelliform threads, and these must be regarded as real zygozoospores.

It seems evident that the process of reproduction by means of sporules is the only one that can explain the enormous rate of multiplication of the majority of the Diatomaceæ, while the other processes of duplication and reproduction will account for the greater rarity of some forms. Viewed from a physiological standpoint, therefore, sporular reproduction is of the highest importance, as by this means countless individuals are formed, all of which co-operate in supporting animal life by giving off the oxygen which is essential for the existence of the latter.