

#### 4: THE NITZSCHIACEAE

##### 4.1 Introduction

The Nitzschiaceae contains some 10 genera, of which only four, Nitzschia, Hantzschia, Bacillaria and Cylindrotheca, are commonly encountered. At other times various other genera have been referred to this group, e.g. Denticula (by Grunow 1862), or separated from the genera included within it today, e.g. Fragilariopsis, Grunowia, Tryblionella, all of which are now sections of Nitzschia (q.v.).

It is to Grunow (1860) that we owe the first recognition of this grouping (as the family 'Nitzschieae'), and it is his work (1862, 1870, 1877, and in Cleve & Grunow 1880) which forms the basis for much of our present classification. Thus, it was Grunow who founded the genera Gomphonitzschia (1870) and Hantzschia (1877), and who made the first comprehensive, infrageneric classification of Nitzschia (in Cleve & Grunow 1880).

As has already been mentioned ('Introduction'), a member of the Nitzschiaceae, Bacillaria paxillifer, was one of the first diatoms to be discovered (by O.F.Müller 1786). Later, Nitzsch (1817) described several other species of diatom, which he referred to the genus Bacillaria, although most of these have subsequently been transferred to other genera and families. One, however, 'Bacillaria sigmoidea', later became the type of Hassall's (1845) genus Nitzschia (which is conserved against the earlier Sigmatella of Kützing 1844, and against Agardh's Homoeocladia, 1827: see I.C.B.N. 1972).

In 1845 Nitzschia contained only one species, other forms now referred to that genus being scattered through various genera, e.g. Synedra and Surirella (see Mills 1933-6). W. Smith (1853), however, included 23 species in Nitzschia (besides some in Tryblionella), and since this time the genus has grown, sometimes very rapidly, so that it now contains over 700 described 'species'. The next largest genus

of the Nitzschiaceae, Hantzschia, includes only about 33 species (Van Landingham 1971), while the other genera are very small indeed (see 'Minor genera').

The original description of the Nitzschiaceae, given by Grunow (1860), was 'Gerade oder gebogen, Nebenseiten unsymmetrisch, meist mit einem dem einen Rande genäherten Kiele. Theilung schief. Querschnitt, wenn eine verbindende Membran vorhanden, rhombisch.' As can be seen also from a subsequent paper (1862), Grunow placed great stress on the presence of a keel, and on the shape of the frustule in transapical section. Later, the presence of a 'canal raphe' and 'Kielpunkte' was noted and added to the description of the group (Schütt 1896). In 1930, Hustedt wrote 'Jede Schale mit einer auf einen mehr oder weniger vortretenden Kiel verlagerten Kanalraphe, die durch zahlreiche Röhrchen (Kielpunkte) mit dem Zellinnern in Verbindung steht. Zentralporen vorhanden, dann aber meistens schwer sichtbar, oder gänzlich fehlend', and a more recent work (Patrick & Reimer 1966) continues this emphasis on keel and canal raphe. It is alarming, therefore, to find that many supposed members of the Nitzschiaceae, e.g. most Hantzschia spp., many Nitzschia spp., Bacillaria, and Cylindrotheca, lack any folding of the valve which might be construed as a keel (this dissertation, and Reimann & Lewin 1964), while the presence of fibulae fails to separate the Nitzschiaceae from the Surirellaceae, the Epithemiaceae, Amphiprora or Auricula (see Paddock & Sims 1977). Furthermore, no 'canal' can be distinguished under the raphe in H. virgata var. intermedia or Cylindrotheca.

It becomes pertinent to ask, therefore, what, if anything, distinguishes the Nitzschiaceae from other groups of diatoms, especially from those whose members possess fibulate raphe systems? This matter will be examined later (see 'Final Discussion') in the light of the observations reported hereafter.