

Science in culture

Spiritual shapes

Ernst Haeckel's 'art forms in nature'.

Martin Kemp

The "argument from design" held that the wondrous forms and mechanisms of the created Universe bear irrefutable witness to the existence of a supreme deity. Charles Darwin's theory of natural selection seemed to deal it a devastating blow. If, to use Ernst Haeckel's reasoning, there were no preconceived designs but only selection according to "natural choice", God could no longer be hailed as the direct designer of every individual cog in nature's clockwork. If God were to survive at all, 'He' needed to be located elsewhere in the temporal system through which things have come into being.

Haeckel was born in Potsdam in 1834 and

was the long-term inaugural professor of zoology at the University of Jena (1865–1909). He achieved a very particular and highly influential solution to the dilemma of being both an evolutionist and a deist. Famous for his formula that "ontogeny recapitulates phylogeny" and notorious for the eugenic implications of his ideas (see *Nature* 395, 447; 1998), he saw the apparently contradictory aspects of nature — organic and inorganic, spiritual and material, matter and energy — as the "attributes of the one underlying substance". This substance, at once material and psychic, was identical with God.

According to Haeckel, everything was infused with the substance's formative and psychic spirit, ranging from the "crystal soul" of inorganic materials, through the "cell soul" of the simplest

unicellular organisms, to the highest consciousness of mammals. In this context, God could be characterized as "the infinite sum of all natural forces, the sum of all atomic forces and all ether-vibrations". This spirit was not to be thought of as an abstract entity infused in the physical world from an exterior being, because "our scientific experience has never yet taught us of the existence of forces that can dispense with a material substratum". Haeckel reserved particular scorn for the "anthropomorphic representation of God", which "degrades this highest cosmic concept to that of a gaseous vertebrate".

The supreme popular manifestation of Haeckel's witness to natural design was his *Kunstformen der Natur* (art forms in nature), issued between 1899 and 1904 in ten instalments, each with ten plates of marvellous organisms, ranging from the unicellular radiolarians, on which he was particularly expert, to birds with patterned plumage and horned ungulates.

The coloured and monochrome plates parade a visual feast of natural symmetries. Haeckel consciously draws out the orderliness of natural design in his own highly skilled depictions, which have been visually pitched to come across with full beauty in Adolf Giltch's accomplished lithographs.

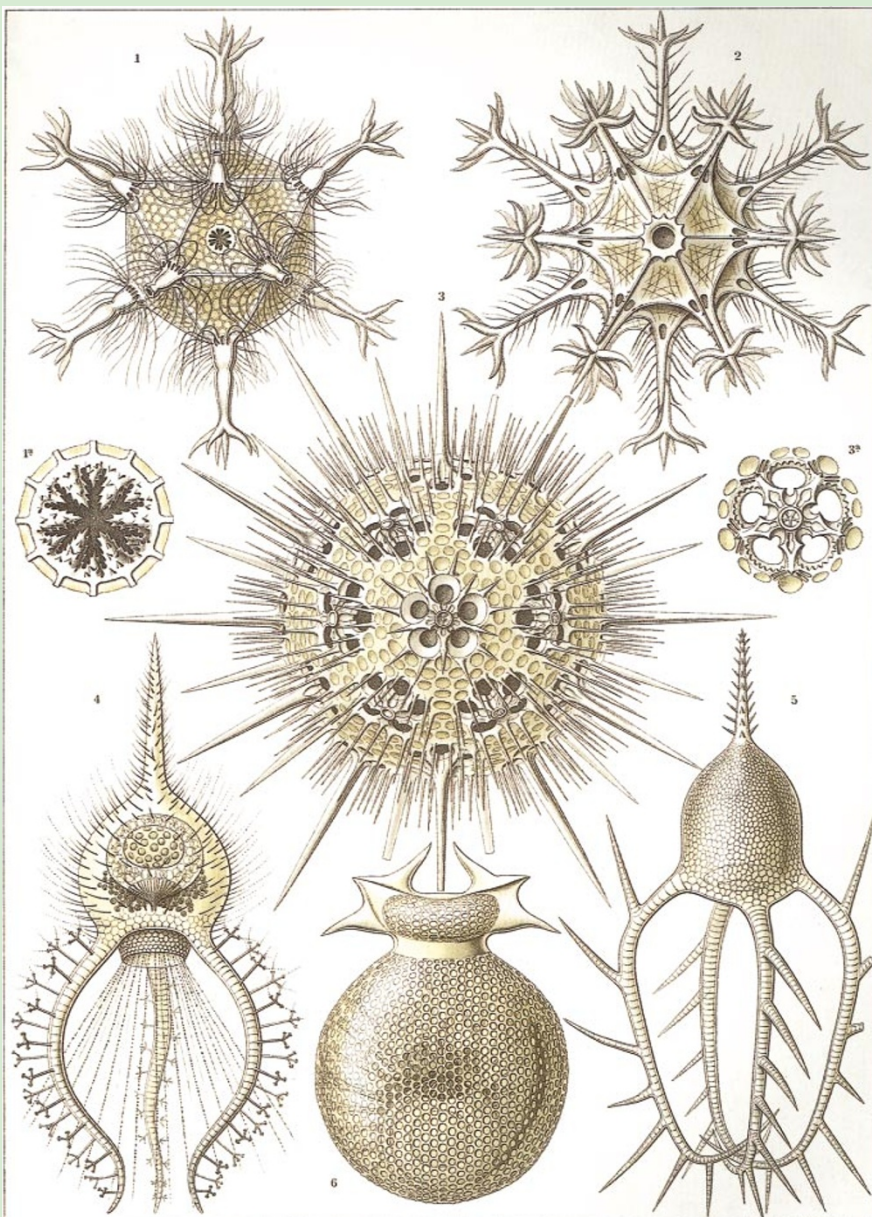
The superb plates of Haeckel and Giltch played an active part in the aesthetic of their time, adopting stylistic features of late-nineteenth-century design to enhance the formal wonders of the organisms, and in their turn influencing the mores of contemporary art. Aware that his images were beginning to affect the artists of his time, Haeckel claimed that "the discovery of countless beautiful forms of life ... [has] awakened a quite new aesthetic sense in our generation and thus given a new tone to painting and sculpture".

This "new tone" was nowhere more evident than in the international craze for art nouveau, or *Jugendstil*. In particular, the miracles of micro-design represented by the skeletons of the radiolaria, in which the "crystallography of organic forms" seemed most evidently disclosed, provided fertile inspiration for the extravagant organic symphonies of spikes, tendrils and plastic curves that became so fashionable around 1900. In so doing, Haeckel's plates infused a sense of visual joy into darwinian evolution that we have not entirely discarded today. ■

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Haeckel's illustrations are on show in the Turmgalerie der Orangerie von Sanssouci, Potsdam, until 15 October 2001.

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Haeckel's depiction of Phaeodaria, a class of unicellular radiolarians, on which he was especially expert.