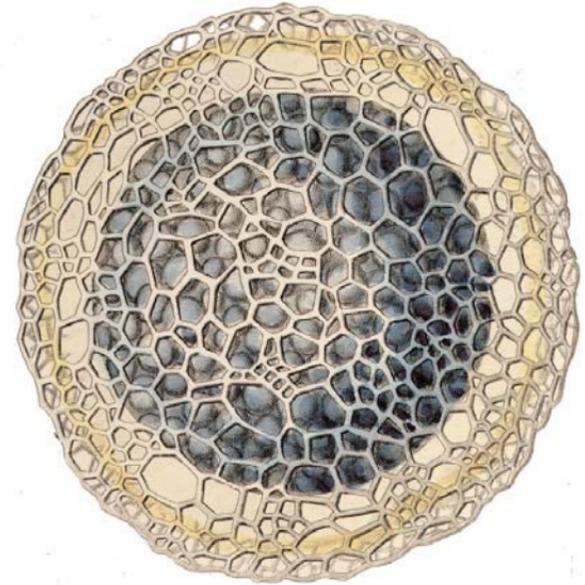


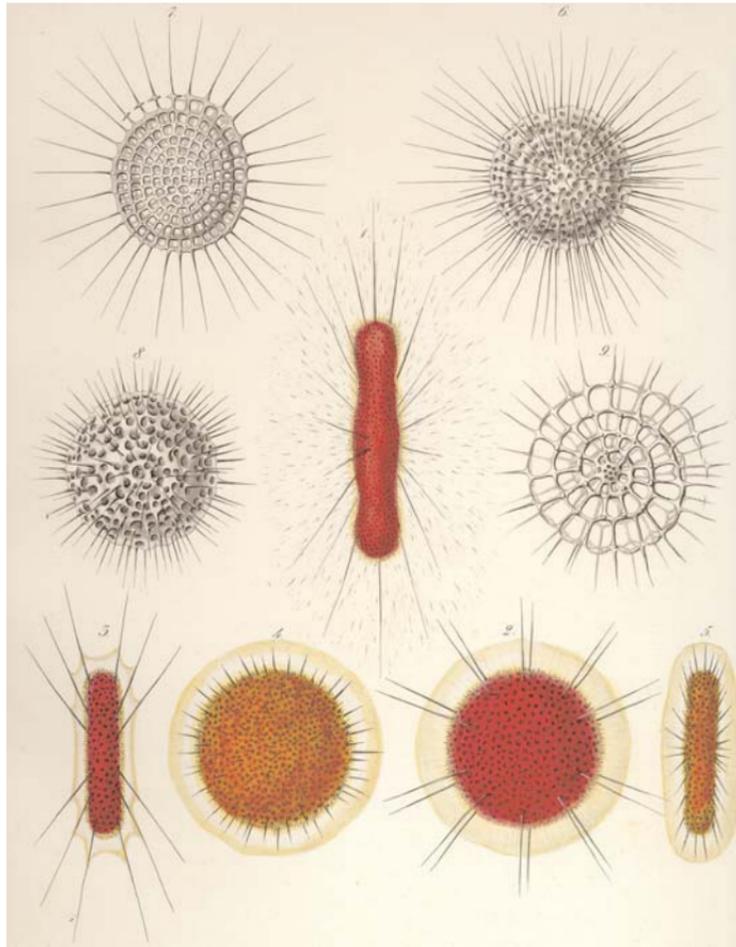
- 01 ?
- 02 Cindy Electronium
- 03 Analogue Rock
- 04 Across the Universe
- 05 ?
- 06 Avant qu'il ait toi
- 07 Carrousel
- 09 ?
- 10 Brandenburg Concerto
- 11 Emperor Tomato Ketchup
- 12 Mammal
- 13 Oxygene 12
- 14 Trio No. 1 in D minor, Op. 49 - IV.
- 15 Tesla Girls
- 16 Ride of the Valkyries
- 17 Don't Fear the Reaper

- Philip Glass
- Raymond Scott
- Stereolab
- Laibach
- Erik Satie
- Gypsophile
- Los Caramelos
- Jean Michel Jarre
- Wendy Carlos
- Stereolab
- They Might Be Giants
- Jean Michel Jarre
- Felix Mendelssohn
- OMD
- Richard Wagner
- Blue Oyster Cult

MUSIC TO CONTEMPLATE PROTISTA BY



By Joanna Ebenstein



Rendering of Radiolaria from Haeckel's Scientific publications

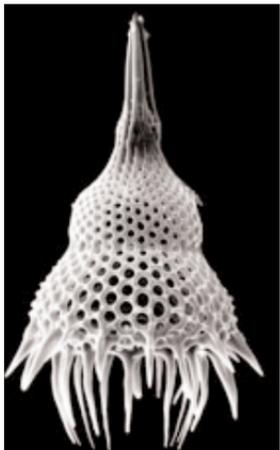
MUSIC TO CONTEMPLATE PROTISTA BY

I have been fascinated with Radiolarians (member of the Protista phylum—thus the name of this collection) for quite some time. Probably from the moment I first saw pictures of them.

This fascination with Radiolarians began as largely (exclusively, actually) a visual one. I didn't know anything about them. When this CD project came along, I thought it would be fun to use it as an excuse to use all the cool images of Radiolarians I had collected, and to do some research and find out more about them and, somehow, work all this into a CD project. My research turned up a surprising array of stories which spanned many disciplines and, like my interest in Protista to begin with, transcended the merely 'scientific.' Perhaps any subject delved into in such a way would yield just as interesting an array of stories?

This set contains 2 CDs—one with music conducive to the contemplation of Protista, and the other with a slideshow of images of Radiolarians. It also contains a few Radiolarian "action figures" (no two of which are alike) of your own to play with and contemplate. You can listen to the music and watch the slide show, or listen to the music and read this booklet. Or listen to the music and play with your Radiolarians. Or any other combination you can think of. With that said, lets begin.

Note: This little booklet does not purport to be encyclopedic. It is merely meant to be interesting and to be conducive to the contemplation of Protista.



WHAT ARE RADIOLARIANS?

Radiolarians are unicellular organisms of the Protista phyla. They produce shells made of silica, the mineral in sand and quartz. Their shells have an incredible variety of shapes—in fact, it has been said that “radiolarians are the biological equivalent of snowflakes.” (“Pattern of life,” Phillip Ball, *Nature Magazine* May 30 2000.) Does this really mean, as it seems to, that no two Radiolarians are alike? I don’t know the answer to that.

Also of interest: Radiolarians are part of what makes up the general term “plankton.” Plankton is the foundation of the ocean’s food web so, scientifically speaking, Radiolarians are pretty important.



Photographs of Radiolaria

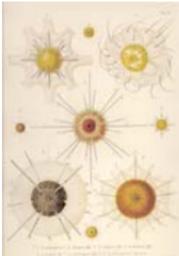
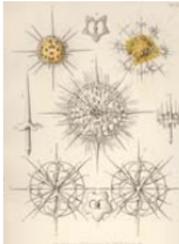
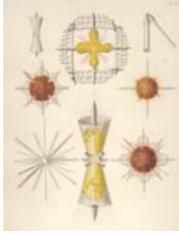
HISTORY, RELIGION, & RADIOLARIA

Many people are probably more familiar with Radiolarians, or at least images of them, than they think, and this is largely due to the work of Ernst Haeckel and his still-popular *Kunstformen der Natur*, or *Artforms in Nature*, which featured images of Radiolaria. But there is so much almost literally unbelievable background to this book and the man who executed it, that I would feel remiss not sharing it. So here I go.

A disclaimer—there are whole books written on this guy. This story does NOT purport to be a complete discussion of the topic. There is a ton of other interesting stuff to say about him, but I simply cannot fit it all in. I am just choosing my points of interest.

That being said, here’s the story:

Ernst Haeckel (1834-1919) started out his professional life as a doctor in Jena, Germany. In 1859, he read Darwin’s *Origin of the Species* and was so blown away that he decided to abandon his practice and devote his life to evolutionary biology. He became a leader and scientific star in this brand-new field; he made his name with the publication of a series of folios documenting hundreds of new species of—yes (and thus his pertinence to the contemplation of Protista)—**Radiolarians** which he discovered. These folios were noteworthy especially for his inclusion of his own lavishly and meticulously-drawn plates illustrating his findings (see images on the following pages). He wrote and lectured for both scientific and popular



audiences, and his became a household name in Germany, and his opinions on any number of matters—spiritual, cultural, and scientific—highly sought after and respected. He was kind-of a proto Carl Sagan type of celebrity scientist.

Although a scientific man by profession, Haeckel was also, (to quote the University of California, Berkeley Museum of Paleontology Evolution web page) “...a free-thinker who went beyond biology, dabbling in anthropology, psychology, and cosmology.”

In many ways, Haeckel stands as a good representative of his times. At that time (the late 19th to early 20th Century), Western cultural thought was undergoing a traumatic re-adjustment period. Contemporary thought systems no longer seemed pertinent or meaningful to many people, and one area in which this was most evident was that of religion.

The new predominance of science and technology, Darwin’s new evolutionary theories, the effects of the industrial revolution and Nietzsche’s proclamation that “God was dead” were all instrumental in calling the old forms of spirituality and religion into question, making them seem outmoded—dead forms holding little or no

relevance for the modern world. Many thinkers were engaged in critiquing these old forms and working towards the development of new forms which would have some pertinence and meaning for the new modern individual.

Haeckel was just such a thinker, and sought the meaning of the universe via his scientific investigations. And he found that meaning in the Radiolarian. He saw God, literally, in the sublime regularity and order of the Radiolarians he discovered, studied, and painstakingly rendered, and this apparent order led him to conclude that the order of these uni-celled organisms bespoke of a universal order which could be seen, literally, in their forms. Remember: this was a time when microscope technology was new, and people were seeing things they with it had never imagined, things that were part of a previously unsuspected natural world.

Haeckel continued on to intuit that mind and matter were inseparable, and professed that to separate them was a profound mistake. This was a problematic ideology, as this division of mind and matter was at the heart of Christian thought and to Post-Enlightenment Western Cultural tradition in general. He saw the need to create a belief system which would recognize and celebrate this unity, and which could re-unite the worlds of science and religion, creating a new “nature religion” or “scientific religion.”

With these principles as a starting point, he started his religion which

he called “the Monostic League.” He described it as a new “natural religion” based on the natural sciences, a “Scientific religion” based on the theory that god reveals himself in all natural phenomena. A religion for the intelligent, the discriminating, the enlightened and the modern. In a sense, he was re-mystifying scientific study which, in its initial inception, had had overtly religious aims.

Haeckel was a zealous proponent of his new religion. He toured and lectured, proselytizing about his new pantheistic nature religion and, at these lectures, displayed his own astoundingly regular (and, some say, falsely regularized, more bespeaking the order he sought than the natural forms he observed)

hand colored drawings and etching of cells, embryos, and other natural phenomena [such as the Radiolarians which he had spent his scientific career studying] which appealed on an emotional level to those seeking greater meaning in life through the study of its apparent rationality, organization, beauty, and essential unity. It was visual imagery which had a striking “shock of the new” quality about it in an age before television and cinema. (*The Jung Cult: Origins of a Charismatic Movement*, Richard Noll, p. 49)

In the 1890s, Haeckel’s Monism began to gain in popularity (he could even count the dancer Isadora Duncan as a member!) The cultural climate in Germany was well poised to be receptive to his ideas. At that time, Germany, was saturated with a variety of ‘cults’ of both a sec-

ular and religious nature which were cropping up in response to the overwhelming need for new answers to old questions. A theme common to many of these groups was the attempt to reconcile science and spirituality, or to reconnect with older, paganistic, ‘non-rational’ rituals and ways of being. In other words, to find a way to balance the spiritual void left by a totally rational worldview in which science was the only real belief system left. A few of the movements popular at this time were: Wagnerism (sic), pan-Germanism, Nietzscheism, Anarchism, Marxism, Theosophy, Sun-Worshipping, Nature-Worshipping, and Spiritualism. In this melange, Haeckel’s Monism found a ready audience, and its popularity was furthered with the publication and immense best-sellership of his book *Die Weltratsel (The Riddle of the Universe)*, first issued in 1895, which outlined the precepts of and called for the establishment of his new Monistic “science religion.”

OK. There is one other important and not-so-pretty thing about Haeckel which I have thus far neglected to mention and that is this: Haeckel was also a notorious anti-semitic, racial eugenicist, and social darwinist. His religious ideology was well-saturated with these sentiments, and his support of these ideas did a lot to give them cultural credence. He was, after all, a well-known and respected man of science and culture, and his ideas were very influential; people looked to him for scientific, spiritual, and cultural guidance, and took his word very seriously. One historian at least has placed on Haeckel a lot of

the blame for ideas which would culminate in the Holocaust's Final Solution. As quoted by David Brody in "Ernst Haeckel and the Microbial Baroque," *Cabinet Magazine* Issue 7: Summer 2002):

[Haeckel's] philosophical support for racist eugenics, coupled with his widespread popular appeal, was arguably crucial to the legitimization of such ideas in Germany, and historian Daniel Gasman has gone so far as to lay blame for the Holocaust virtually at Ernst Haeckel's feet. Gasman demonstrates, convincingly, that Haeckel was an anti-Semite, and that his ponderous authority "did much to bring the Jewish question into the realm of biology."

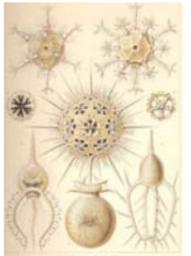
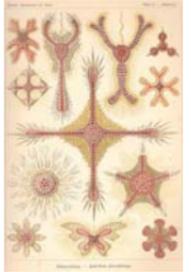
If what Daniel Gasman is true (though I suspect it is an exaggeration) then the chain begun at the randomly chosen subject of The Radiolarian leads ultimately to a very real historical tragedy—The Holocaust. Who would have thought that a pretty part of the plankton community could have indirectly had so much to do with the very real and very tragic and very concrete life of humans? This astounds and fascinates me to no end, and hopefully will you, as well. And one can see in his artwork, once one knows the story, the totalizing impulse of one who is driven to create his own religion, and that drive toward a perfection of natural forms and the exclusion of the imperfect form of inherent in the nature of a social eugenicist.

THE RADIOLARIAN AND THE ARTS

Radiolarians and Haeckel's popularization of their forms also had a significant impact on the arts of the time. Many art historians site the discovery of Radiolarians and their microbiotic kin (via the new technology of The Microscope) and communication of this discovery to a non-scientific public (via in part the popular renderings featured in Ernst Haeckel's *Kunstformen der Natur*, and in his popular Monist lecture series) as having had a profound influence on 20th Century art history, both directly and indirectly.

Haeckel's *Kunstformen der Natur*, hugely popular at the time of its release and sometimes referred to as "the first ever science-art coffee-table book" consists of a collection of fantastic plates 'documenting' (or, as many would say, elaborating on,) nature's creatures (see side bars for images.) As described by David Brody in "Ernst Haeckel and the Microbial Baroque" *Cabinet Magazine*, Issue 7: Summer 2002)

Its lavish images of self-enlacing, baroque jellyfish, with their translucent baldachins of tendrils, and his constellations of plankton [Radiolarians] magnified to Romanesque filigrees, directly influenced the more self-consciously decorative, asymmetrical



From Haeckel's *Kunstformen der Natur*

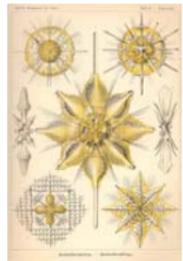


vocabulary of Art Nouveau and Jugendstil. Art Forms was eagerly perused by the Surrealists, notably Max Ernst, and almost certainly by the Bauhaus painters Klee and Kandinsky. Thus, even contemporary artists who have never seen the book can hardly have avoided the pulsations of its influence.

The influence of Radiolarians was even more direct on at least one occasion. From the article “Mining Science for Artistic Inspiration” by Jonathan Keats:

As inspiration for his entrance portal to the 1900 Paris Exposition Universelle, architect Rene Binet didn't for an instant look back to the stilted pillars and pediments of classical temples. Rather, modern to the bone, he set his gaze on the crystalline exoskeletons of marine protozoa known as radiolarians.

Granted, radiolarians had been around for eons—far longer than Paris or architecture or people—but before the invention of the modern microscope, they'd been wholly invisible. Their discovery, along with that of amoebae, was, naturally, revolutionary for biology...the study of such microbes proved as great a breakthrough for art of the 20th century.



From Haeckel's *Kunstformen der Natur*

Binet was one of countless art nouveau designers and painters to see, in biomorphic forms, a whole new visual vocabulary. No longer was the artist's picture of nature restricted to trees and mountains and clouds. By depicting a realm beyond the plane of everyday observation, artists could free themselves from the expectation that they show the world realistically, and explore their own imagination.

For Binet, that meant simply adapting geometric variations on the radiolarian to suit the larger-than-life scale of Paris at the turn of the century.

I was shocked to find this information. The idea that this randomly chosen subject of Radiolarians (ok, not randomly, exactly, but because of a merely visual interest) could have had such a direct impact on an artistic era I had long been enamored with, was astounding to me. Are protista, I ask you then, not worth contemplating?



Above and below: Binet's entrance portal to the 1900 Paris Exposition Universelle. Behind: Haeckel's scientific renderings of Radiolaria

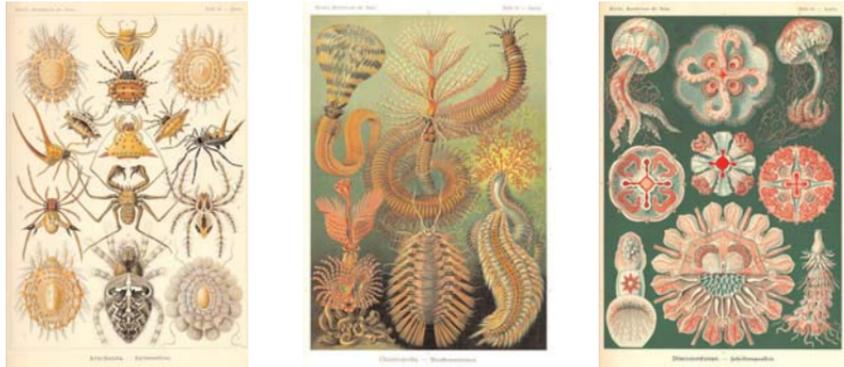


A CONCLUSION OF SORTS

So many themes become illustrated by following the thread of The Radiolarian. The power of images to enchant and coerce. The danger of a scientific professional elite. The power of an authoritative presentation. Art in imitation of life. The ways in which art, science, and religion are entwined, despite our attempts to divide them all into neat little categories. Just to name a few.

It is my sincere hope that I have provided you with with ample information to aid you in the contemplation of Protista.

THE END



From Haeckel's *Kunstformen der Natur*

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