montmorillonite(?). The montmorillonite is secondary and appears to be associated with the iron oxides.

With the possible exception of the calcite, all the major constituents are of sedimentary origin and have undergone little or no change since deposition. The kaolin was transported as kaolin and laid down in a continuous blanket over many thousand square miles. This suggests deposition in a large shallow freshwater lake, an idea supported by the nature of the flora and the presence of lignite lenses in the clay beds. The shallowness enabled streams to build natural levees and carry sand for some distance into the lake.

Such a large blanket of relatively pure kaolin must indicate a source area (to the west) that was subject to deep intensive weathering but little erosion at the close of the Paleocene epoch. This is about the time of formation of the bauxite and kaolin deposits of the Gulf Coastal Plain, and possibly also of the kaolin deposits in the Pacific coastal states. The end of the Paleocene epoch seems to have been a time of intense and rapid weathering over much of the country.

WILLIAM E. BENSON

U.S. Geological Survey
Denver Federal Center, Denver, Colorado

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Spirodiscus Ehrenberg Identified as *Ophiocytium* Nägeli

EHRENBERG'S work, the *Infusionsthierchen* (*1*), is an important landmark in the history of protozoology and a minor one in the history of bacteriology. In this work, Ehrenberg set up a family Vibrionia, with five genera, *Vibrio, Bacterium, Spirillum, Spirochaeta,* and *Spirodiscus.* Among these genera, the first four include most of the bacteria as known at the time. *Spirodiscus,* on the other hand, is clearly not a bacterium. It appears to have remained unidentified until the present.

A single species, *Spirodiscus fulvus,* was listed. It had been named without description in an earlier publication (*2*). In the original description (*1*) the main points were as follows:

Dreissigste Gattung: Scheibenspirale. Spirodiscus. Spirodisque.

Character: Animalia e familia Vibrioniorum, divisione spontanea imperfecta (et obliqua ?) in catenam filiformem s. cochleam rigidam disciformem accrescens. . . .

99. Spirodiscus fulvus, gelbbraune Scheibenspirale. Tafel V. Fig. xiv.

Sp. cochlea lenticulari, obsolete articulata, fulva, 100-mam lineae partem fere lata. . . .

The organism had been found at Syrjanofskoi, in the Altai Mountains, in fresh water among confervas.

Some of the points of this description, as "imperfect spontaneous division," appear to be without objective meaning. The figure to which the description refers consists of four little drawings whose appearance and size may be understood by the statement that they look like pods of bur clover, *Medicago,* and are colored with brown and green stripes. The characters to which anything identified as *Spirodiscus* must conform are these: it is a freshwater organism with cylindrical pigmented cells more or less compactly coiled and having an overall diameter of about 20 μ, that is, 1/100 of a line.

Here it is pointed out that the organism known as *Ophiocytium parvulum* (Perty) Braun conforms to the characters stated. No other organism is known to do so. It is accordingly maintained that *Spirodiscus fulvus* is *Ophiocytium parvulum.*

HERBERT F. COPELAND

Sacramento Junior College
Sacramento, California

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Basaltic Magma at Hawaii Is Saturated in Silica

MODERN knowledge of the geology of Hawaiian volcanoes has established that most of the lava of all the separate volcanoes has been erupted in a stage of primitive shield-building activity. A small volume has been added to many of the volcanoes in a declining phase of the primitive shield-building stage, and a very small amount has been erupted at a few volcanoes in a stage of decadent activity. The petrography of the rocks of the primitive shields is monotonously similar through all exposed depths within a given volcano and among all the different volcanoes. The rock types present are picritic basalt, olivine basalt, and basalt, with olivine-hypersthene basalt important in a few volcanoes.

The differences in mineralogy of the shield-forming rocks are entirely in the amount of olivine and hypersthene present and, apparently, can have been caused by the concentration or removal of phenocrysts of olivine and hypersthene. Rocks formed in the declining phase of the shield-building activity commonly contain phenocrysts of augite and calcic plagioclase but, otherwise, are similar to those making the bulk of the shield.

A most important difference does not appear in the gross mineralogy and, commonly, is not even apparent in microscopic mineralogy. This is the fact that the abundant olivine basalt of the primitive shield is chemically a silica-saturated rock, whereas the apparently similar olivine basalt erupted during the declining phase is chemically undersaturated in silica. Deficiency of silica is indicated by normative olivine and sometimes nepheline in the rocks of the Hawaiian province. The significant abundance or scarcity of silica can be compared straightforwardly if the percentage of normative olivine and nepheline is not used, but rather a figure is computed from the chemical analysis that states the percentage of silica needed to form saturated normative minerals. The computed abundance or scarcity of silica has been compared with