Paleozoic genera of so-called hystrichospheres. I conclude that these latter genera are dinoflagellates; some of them apparently represent encysted stages of the life cycle. The "non-dinoflagellate hystrichospheres," in contrast, are a polyphyletic group that includes egg cysts, and entire tests of mostly unknown affinities.

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Wall Structure in Hystrichospheres *Hystrichosphaera* and *Hystrichosphaeridium*

Hystrichosphaera O. Wetzel (Mesozoic-Recent) and *Hystrichosphaeridium* Deflandre (Mesozoic-Tertiary) are two of the most widespread and abundant hystrichospheroid dinoflagellates (= hystrichosphere *sensu stricto* = dinoflagellate cyst). In each genus the test consists of a hollow central body bearing numerous radially directed processes. The number and distribution of the processes reflect a dinoflagellate tabulation: "plate-centered" processes, one per plate in *Hystrichosphaeridium*, and "plate-angle" processes, one at each corner of a plate in *Hystrichosphaera*.

The typical processes in *Hystrichosphaeridium* are large and hollow, with a trumpetlike flare at the distal end; those of *Hystrichosphaera* are smaller, tapered, apparently solid, and forked at the tips. Little has been written about the microstructure of the wall or the relationship of the interior of the processes to the cavity of the central body. Recent studies, aided by a technique for making 2- to 5-micron-thick serial sections of individually selected specimens, illuminate the wall microstructure in these genera. The wall is basically two-layered. The thicker, inner layer surrounds the central cavity and continues without interruption beneath the hollow processes, which are formed wholly by the thinner outer layer. In *Hystrichosphaeridium*, the outer layer is closely appressed to the inner one between the bases of the processes, but, in *Hystrichosphaera*, folds in the outer wall extend between process bases to form the ridges that define the polygonal plate areas characteristic of that genus.

The serial-sectioning technique used in this study should be applicable to the study of other hystrichomorphs.

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Wegscheiderite, a New Saline Mineral from the Green River Formation, Wyoming

A new sodium carbonate-bicarbonate mineral has been found in a drill core from the Perkins Well No. 1 that penetrates the Green River formation, Sweetwater County, Wyoming, at the NE 1/4 sec. 32, T.15 N., R.108 W. Chemical analysis shows that the formula is $Na_2CO_3 \cdot 3NaHCO_3$. The new mineral has also been found in drill cores from the Perkins Well No. 2, 6 miles to the west, and the Grierson Well No. 1 (NW 1/4 sec. 4, T.16 N., R.109 W). In the Perkins Well No. 1, the mineral occurs in a pink stratum, 3 inches thick, at depths marked 1609′6″ to 1609′9″. The color is due to contamination by organic matter (1.38 per cent); a trace of halite is also present. A thin section shows that the material consists of fibrous aggregates of tiny acicular to bladed crystals. The indices of refraction are $\alpha = 1.433$, $\beta = 1.519$, $\gamma = 1.528$.

The space group and cell data of the new mineral determined with the Buerger precession camera, are: triclinic, $P\,1$; $a = 10.04$ Å $\pm$ 0.03 Å, $b = 15.56 \pm 0.04$, $c = 3.46_6 \pm 0.01$; $\alpha = 91°55'$, $\beta = 95°49'$, $\gamma = 108°40'$ (all $\pm$ 05'); cell contents: 2 [$Na_2CO_3 \cdot 3NaHCO_3$]; specific gravity: 2.34_1 (observed), 2.334 (calculated). Indexed X-ray powder-diffraction patterns show that the d spacings and relative intensities of the six strongest lines are: 2.95_7 (100), 2.64_6 (60), 2.21_4 (50), 2.83_1 (30), 2.79_3 (30), 3.68 (30).

This mineral is identical with the synthetic compound $Na_2CO_3 \cdot 3NaHCO_3$, first synthesized in 1913 by R. Wegscheider during a phase-equilibrium study of the system Na_2CO_3-$NaHCO_3$-H_2O. In his honor we propose to name the new mineral wegscheiderite.

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Flume Studies on the Transport of Pebbles and Cobbles on a Sand Bed

During experiments on sediment transport and resistance to flow with a uniform .33 mm sand, data were taken on the movement of individual rocks having intermediate diameters from about 0.1 to 0.5 foot. The experiments were conducted in a flume 2 feet wide by 60 feet long, and depth was held constant at 0.5 foot.

The experiments showed that the rocks on the sand bed moved downstream consistently only if the flow was in the upper regime—that is, only if the bed forms were plane bed, standing waves, or antidunes. For this condition, the rocks moved at velocities that were approximately half the average velocity of the water. With all bed forms in the lower flow regime (ripples, ripples superimposed upon dunes, and dunes), the boulders always moved upstream and down into the bed. That is, scour pocket formed on the upstream side of the rock, and the rock rolled into it. The distance the rocks moved was proportional to their sizes and averaged ½ to 1 diameter upstream and ¼ to ½ diameter down into the bed.

These data indicate that cross-bedded sand deposits formed by the ripple or dune phases of transport would contain few, if any, pebbles or cobbles. The data also suggest that pebbles and cobbles would be present in a deposit that is mainly sand only if the bedding within the deposit were planar or had been planar during transport.

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Evidence of the Origin and Time of Separation of Magmas of the Monteregian Hills, Quebec, from Development of Radiogenic Sr^{87}

The post-Trenton intrusive necks known as the Monteregian Hills are conspicuous landmarks of the St. Lawrence Lowland in southern Quebec. Essexites and syenites, often with nepheline, are the commonest rock types. K-Ar age determinations by the Canadian Geological Survey and by us on biotite from three localities indicate Cretaceous age (Johnston, 110 m.y; Brome, 122 m.y; Megantic, 115 m.y., 126 m.y.). Rb-Sr data on minerals and whole rocks from these and other localities are now available. Intersections of radiogenic Sr^{87} development lines indicate (1) time of separation of the magmas, (2) a source material