We must reiterate, however, that this explanation, which attempts to shed some light on the phenomenon of inverse grading observed in thick subaqueously emplaced cobble or boulder beds such as at Wheeler Gorge, is simplistic compared to the enormously complex mechanisms involved in the rapid transportation of great masses of clastic debris for long distances.

REFERENCES

BHATTACHARJI, S., 1967, Mechanics of flow differentiation in mafic and ultramafic sills: Jour. Geology, v. 75, p. 101–112.

———, AND SMITH, C. H., 1964, Flowage differentiation: Science, v. 145, no. 3628, p. 150–153.

FISHER, R. V., AND MATTINSON, J. M., 1968, Wheeler Gorge turbidite-conglomerate series, California; inverse grading: Jour. Sedimentary Petrology, v. 38, p. 1013–1023.

SOUTHARD, J. B., 1970, Impossibility of Bernoulli pressure forces on particles suspended in boundary layers: discussion of a paper by R. V. Fisher and J. M. Mattinson: Jour. Sedimentary Petrology, v. 30, p. 518.

DISCUSSION OF A PAPER BY C. D. GEBELEIN ENTITLED "DISTRIBUTION, MORPHOLOGY, AND ACCRETION RATE OF RECENT SUBTIDAL ALGAL STROMATOLITES, BERMUDA"[1]

JONATHAN H. SHARP
Institute of Oceanography, Dalhousie University, Halifax, Nova Scotia

From a biological viewpoint, I am able to make several complementary comments to some of the thesis in the paper by Gebelein (1969): 1) That the distribution of the stromatolites is controlled by physical environmental factors is supported by the indication that it is not controlled by the distribution of the two species of algae. 2) The importance of *Schizothrix calcicola* in forming stromatolites can be seen in laboratory experiments of algal mat formation by unialgal cultures of this species. 3) With the recent revision in blue-green algal taxonomy (Drouet, 1963; 1968), it can be seen that *S. calcicola* is probably the requisite species in all Recent algal stromatolites that have been reported with identification of species.

Gebelein states that the second filamentous alga, *Oscillatoria submembranacea*, grows more slowly than *S. calcicola;* this may be the case, but inability to grow this species in the laboratory prevents me from confirming the statement.

I cannot concur on several points in Gebelein's paper and my evidence seems to contradict two of his statements. He emphasizes that the sediment particles are deposited in the stromatolites by "agglutination onto the mucilaginous sheaths" of the algae. It is difficult for me to conceive of mucilage adhesive strength sufficient to hold the sediment particles against a current velocity of 1–11 cm/sec, especially realizing the immense size of the particles in comparison to the tiny algal filament sheaths. It would seem more reasonable to interpret the sediment trapping as being due to the baffle effect of multifilamentous strands of algae from the stromatolite surfaces. My studies show also that Gebelein has misinterpreted the roles of the two algal species in trapping and binding of the sediment particles. Evidence for these two points and the observations supporting his paper can be found in a paper published in *Limnology and Oceanography* (Sharp, 1969).

[1] Manuscript received May 20, 1969.

REFERENCES

DROUET, FRANCIS, 1962, Ecophenes of *Schizothrix calcicola:* Proc. Acad. Nat. Sci., v. 115, p. 261–281.

———, 1968, Revision of the classification of the Oscillatoriaceae. Monograph Acad. Nat. Sci. Phila., No. 15, 370 p.

GEBELEIN, C. D., 1969, Distribution, morphology, and accretion rate of recent subtidal algal stromatolites, Bermuda: Jour. Sedimentary Petrology, v. 39, p. 49–69.

SHARP, J. H., 1969, Blue-green algae and carbonates—*Schizothrix calcicola* and algal stromatolites from Bermuda: Limnology and Oceanography, v. 14, p. 568–578.