With *Rhizobium* cultures a No. 5 filter was used. This has a pore size of one micron and will pass particles up to 0·3 micron. Results were rather variable; sometimes it was possible to filter the gonidial stage, at other times it was not, although microscopic examination showed that gonidia were being produced. These variations may possibly be due to the close size of the swarmers and the filter pores.

In the case of *Azotobacter*, consistent results were obtained with a No. 4 filter, which will pass particles less than 3 microns in diameter. Young cultures were used as controls. These were examined microscopically to ascertain that they were not producing gonidia. It was found that filtrates from these cultures contained no viable cells, whereas filtrates from the gonidia-producing cells gave a heavy growth on subculture. By centrifuging the filtrates and examining microscopically, it could be shown that no vegetative cells had passed through the filter.

Failure in the past to filter *Azotobacter* gonidia would appear to be due to workers using filters that were too fine; de Regel[3], for example, used filters with a pore size of 0 75 micron. This would certainly not allow the passage of *Azotobacter* gonidia.

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Erosion in Meanders

Secondary flows are developed when a non-uniform stream passes through a bend, the plane of which contains the vorticity vector of the entry flow[1]. The importance of such secondary velocities in the erosion of river meanders was pointed out originally by Thompson[2], and large transverse secondary velocities have been observed in the flow of air through pipe bends, at Cambridge and elsewhere[3].

Experiments have been conducted in Cambridge on a water flume to investigate the rate of erosion in meanders of different amplitude. The cross-section of the channel at the beginning of each of these experiments was an equilateral triangle of side 4 in., and the water velocity was 6–8 in. per sec. during the experiments. A standard mixture of sand and aluminous cement was used to form the meanders.

Fig. 1 shows the shape of the meanders in the first experiment, and the nature of the erosion observed.

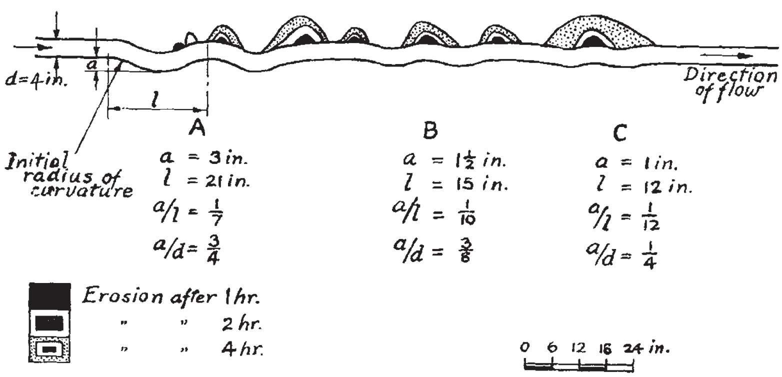

Fig. 1

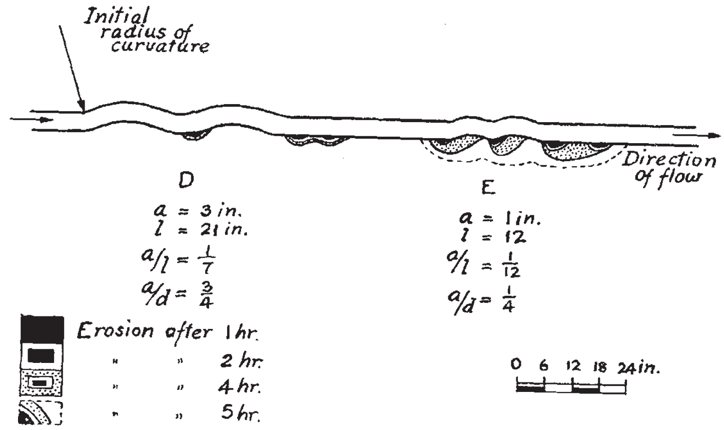

Fig. 2

The rate of erosion was greatest for the smallest meander (C) and least in the largest meander (A). The walls of the channel were eroded on the outside of the meander bends; but almost all the erosion was confined to one wall of the channel, namely, the wall on the outside of the initial bend curvature. The high-velocity water near the surface would be displaced towards this wall by secondary motion in the initial bend[2].

In a second experiment, the initial curvature of each meander was reversed, and the direction of any secondary rotation therefore also reversed. Fig. 2 shows the development of the meanders and indicates that erosion was now completely confined to the other side of the channel; that is, once again the side towards which the high-velocity part of the stream should be diverted by secondary motion in the initial bend. A longer settling length between a large and a small meander was used in this second experiment; but the small meander (E) was eroded more rapidly once more, the erosion starting in each meander on the outside of those bends of the same radius of curvature as the initial radius of curvature.

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