Notes on Recent Observation of Tide Spring, near Broadway, Virginia

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Tide Spring, an ebbing and flowing or periodic spring has been discussed by Meinzer,[1] and Tolman,[2] and possibly by others. Ebbing and flowing springs flow at either regular or irregular intervals, and the intervals may be a matter of minutes, hours, days, or a greater length of time. Most are a long distance from the sea and have no relation to ocean tides. Almost all issue from limestone, and the temperature is that of normal ground water. Only about twenty ebbing and flowing springs are known

[1]Meinzer, O. E. 1936. Ebbing and flowing springs. [in Cady, R. C. Ground Water Resources of Shenandoah Valley, Virginia. Va. Geol. Surv. Bull. 45: 52-54.]
[2]Tolman, C. F. 1937. Ground Water, McGraw-Hill, pp. 438-440.

in the United States and about the same number in the rest of the world. An underground pool and siphon system is generally considered to be the cause of the irregularities of flow of such springs.

When Tide Spring is inactive its basin may be completely empty of water, but during discharge the rate may exceed one thousand gallons per minute. An automatic water recorder was operated on this spring for about five years and the record shows both great irregularities and regular periods. Generally, the greatest discharges immediately follow the longest periods of inactivity.

I watched the spring go through a cycle on two days in early September, 1958 after an unusually wet summer. The cycle was complete in approximately one hour and was the same on both days. The water level slowly dropped in the basin to a minimum depth of six or eight inches and immediately began to rise. The water quietly came up at a steadily increasing rate through several holes at the bottom of the basin. The maximum rate of inflow was attained in about ten minutes and coarse sand was lifted one foot above the bottom in the two feet or more of water. Overflow from the basin, which began before the maximum inflow was reached, was estimated to be several hundred gallons per minute. The rate of inflow immediately began to drop off after reaching its maximum. The rate of decline was greatest just after the maximum inflow was reached. Water continued to overflow from the basin for ten to fifteen minutes, until the inflow ceased. The level of water dropped quietly, slowly, and continuously until only about eight inches of water remained in the basin and the cycle began again.

A small spring along the bank of the spillway about ten feet downstream showed no noticeable change during the entire cycle of Tide Spring.