Table 2. Computations of stream flow using a current meter.

Dist. from initial point	Depth of water (ft)	Observation depth (ft)	Time (sec)	Revolutions	Point Velocity (fps)	Mean Velocity (fps)	Area (ft^2) (ft^2)	Flow Rate (cfs)
0	0	0	0	0	0	0	–	–
6	0.9	0.54	56	12	0.58	0.58	3.6	0.21
10	2.4	0.48	56	18	0.84	0.81	10.8	8.10
		1.92	56	16	0.77			
14	3.4	0.68	57	22	1.01	0.95	13.0	12.35
		2.72	58	20	0.89			
18	2.8	0.56	64	18	0.74	0.73	10.8	7.88
		2.24	59	16	0.72			
28	1.1	0.66	61	14	0.63	0.63	4.8	3.02
					Total Stream Flow			31.56

Pitot Tubes

The pitot tube is often used to obtain the velocity of flow in an open channel or pipe. The pitot tube consists of a small-diameter, L-shaped tube pointed upstream, i.e., into the current. Water in the L-shaped tube will rise to a small height above the water surface in the stream. This small height is the velocity head, $v^2/2g$. For low velocities, the rise of the water in the pitot tube may be too small for accurate measurements.

The pitot tube is primarily used for flow measurements in pipes, where the velocities are usually much higher than stream velocities. In pipe flow the water is also subjected to an internal pressure, which influences the height the water rises in the pitot tube. The height of rise, h, in feet is given by

$$h = \frac{p}{w} + \frac{v^2}{2g} \qquad (3)$$

where p = the pressure (lbs/in^2),

v = the velocity of flow (fps), and

g = the acceleration of gravity (32.2 ft/sec^2).

If the height (h) and the pressure (p) in the pipe are read, the velocity (v) may be obtained from

$$v = \left(\left(h - \frac{p}{w}\right)2g\right)^{1/2} \qquad (4)$$

where all factors are as previously defined.