Exercise 12 – Shifting Controls, an example from the Hoosic River

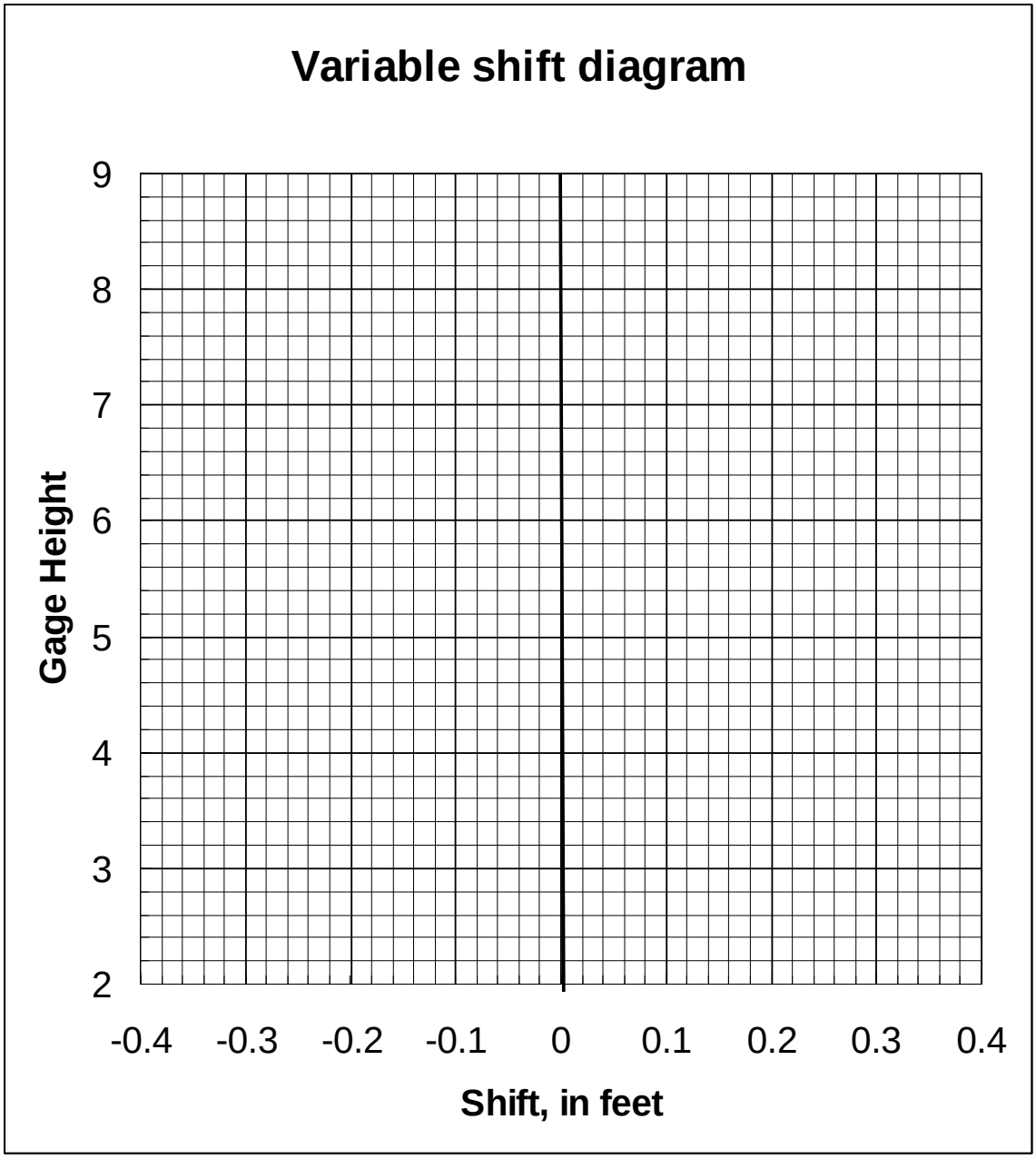
- Using the measurements shown in the table below, and the rating table, rating curve, and rectangular-grid paper for the Hoosic River on the following pages, develop shift-by-stage V diagram(s) for measurement nos. 774-786. A blank table is included to help you compute the shift associated with each measurement.

Measurement information

No.	Date	G.H.	Discharge	Meas. rated
774	8-19-87	3.82	859	G
775	10-6-87	3.49	614	G
776	11-12-87	7.77	5490	F
777	12-21-87	3.61	702	G
778	12-29-87	4.24	1160	G
779	2-2-88	2.70	229	G
780	3-14-88	3.20	449	G
781	3-23-88	3.19	441	G
782	5-5-88	2.66	208	G
783	6-20-88	4.48	1350	G
784	7-21-88	5.70	2570	F
785	9-8-88	5.04	1840	G
786	10-18-88	3.02	365	G

Shift computations

Meas. Number	Gage Height	Measured discharge	Rating discharge	% diff (error in measured Q)	Rating GH for measured discharge	Shift indicated by measurement
774	3.82	859				
775	3.49	614				
776	7.77	5490				
777	3.61	702				
778	4.24	1160				
779	2.70	229				
780	3.20	449				
781	3.19	441				
782	2.66	208				
783	4.48	1350				
784	5.70	2570				
785	5.04	1840				
786	3.02	365				


Variable shift diagram
Gage Height
9
8
7
6
5
4
3
2
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
Shift, in feet

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

EXPANDED RATING TABLE

TYPE: LOG

DATE PROCESSED: 02-05-1988 @ 12:51 BY GHEBERT

~~01~~534500

HOOSIC RIVER NEAR EAGLE BRIDGE NY

OFFSET: (2.70,1.60)

DD: 2 TYPE: 001 RATING NO: 58.0

START DATE/TIME: 01-26-86 (1030)

BASED ON _____ DISCHARGE MEASUREMENTS, NOS _____, AND _____, AND IS _____ WELL DEFINED BETWEEN _____ AND _____ CFS

COMP BY _____ DATE _____ CHK. BY _____ DATE _____

DISCHARGE IN CUBIC FEET PER SECOND (EXPANDED PRECISION)

GAGE HEIGHT (FEET)	.00	.01	.02	.03	.04	.05	.06	.07	08	.09	DIFF IN Q PER TENTH FT
2.70	175.0*	178.2	181.4	184.7	188.0	191.3	194.6	198.0	201.4	204.8	33.30
2.80	208.3	211.8	215.3	218.8	222.4	226.0	229.6	233.3	237.0	240.7	36.20
2.90	244.5	248.2	252.0	255.9	259.7	263.6	267.5	271.5	275.5	279.5	39.00
3.00	283.5	287.6	291.7	295.8	300.0	304.1	308.4	312.6	316.9	321.2	42.00
3.10	325.5	329.8	334.2	338.6	343.1	347.6	352.1	356.6	361.1	365.7	44.90
3.20	370.4	375.0	379.7	384.4	389.1	393.9	398.7	403.5	408.3	413.2	47.70
3.30	418.1	423.0	428.0	433.0	438.0	443.1	448.2	453.3	458.4	463.6	50.70
3.40	468.8	474.0	479.2	484.5	489.8	495.2	500.6	505.9	511.4	516.8	53.50
3.50	522.3	527.8	533.4	539.0	544.6	550.2	555.8	561.5	567.2	573.0	56.50
3.60	578.8	584.6	590.4	596.3	602.2	608.1	614.0	620.0	626.0	632.1	59.30
3.70	638.1	644.2	650.3	656.5	662.7	668.9	675.1	681.4	687.7	694.0	62.30
3.80	700.4	706.7	713.2	719.6	726.1	732.6	739.1	745.7	752.2	758.9	65.10
3.90	765.5	772.2	778.9	785.6	792.4	799.2	806.0	812.8	819.7	826.6	68.00
4.00	833.5	840.5	847.5	854.5	861.6	868.6	875.8	882.9	890.1	897.3	71.00
4.10	904.5	911.7	919.0	926.3	933.7	941.0	948.4	955.9	963.3	970.8	73.80
4.20	978.3	985.9	993.4	1001	1009	1016	1024	1032	1039	1047	76.70
4.30	1055	1063	1071	1079	1087	1094	1102	1110	1119	1127	80.00
4.40	1135	1143	1151	1159	1167	1176	1184	1192	1200	1209	82.00
4.50	1217	1226	1234	1243	1251	1260	1268	1277	1285	1294	86.00
4.60	1303	1311	1320	1329	1338	1346	1355	1364	1373	1382	88.00
4.70	1391	1400	1409	1418	1427	1436	1445	1455	1464	1473	91.00
4.80	1482	1491	1501	1510	1519	1529	1538	1548	1557	1567	94.00
4.90	1576	1586	1595	1605	1615	1624	1634	1644	1654	1663	97.00
5.00	1673	1683	1693	1703	1713	1723	1733	1743	1753	1763	100.0
5.10	1773	1783	1794	1804	1814	1824	1835	1845	1855	1866	103.0
5.20	1876	1886	1897	1907	1918	1929	1939	1950	1960	1971	106.0
5.30	1982	1992	2003	2014	2025	2036	2047	2057	2068	2079	108.0
5.40	2090	2101	2112	2124	2135	2146	2157	2168	2179	2191	112.0
5.50	2202	2213	2225	2236	2247	2259	2270	2282	2293	2305	114.0
5.60	2316	2328	2340	2351	2363	2375	2386	2398	2410	2422	118.0
5.70	2434	2445	2457	2469	2481	2493	2505	2517	2530	2542	120.0
5.80	2554	2566	2578	2590	2603	2615	2627	2640	2652	2664	123.0
5.90	2677	2689	2702	2714	2727	2740	2752	2765	2777	2790	126.0
6.00	2803	2816	2828	2841	2854	2867	2880	2893	2906	2919	129.0
6.10	2932	2945	2958	2971	2984	2997	3011	3024	3037	3050	132.0
6.20	3064	3077	3090	3104	3117	3131	3144	3158	3171	3185	134.0
6.30	3198	3212	3226	3239	3253	3267	3281	3294	3308	3322	138.0
6.40	3336	3350	3364	3378	3392	3406	3420	3434	3448	3462	140.0

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION PAGE***

EXPANDED RATING TABLE TYPE: LOG

DATE PROCESSED: 02-05-1988 @ 12:51 BY GHEBERT

34500

OSIC RIVER NEAR EAGLE BRIDGE NY DO: 2 TYPE: 001 RATING NO: 58.0

FFSET: (2.70,1.60) START DATE/TIME: 01-26-86 (1030)

GAGE HEIGHT (FEET)	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09	DIFF IN Q PER TENTH FT
	DISCHARGE IN CUBIC FEET PER SECOND						(EXPANDED PRECISION)				
6.50	3476	3491	3505	3519	3533	3548	3562	3576	3591	3605	144.0
6.60	3620	3634	3649	3663	3678	3693	3707	3722	3737	3751	146.0
6.70	3766	3781	3796	3811	3825	3840	3855	3870	3885	3900	149.0
6.80	3915	3930	3945	3961	3976	3991	4006	4021	4037	4052	152.0
6.90	4067	4083	4098	4114	4129	4145	4160	4176	4191	4207	155.0
7.00	4222	4238	4254	4269	4285	4301	4317	4333	4348	4364	158.0
7.10	4380	4396	4412	4428	4444	4460	4476	4493	4509	4525	161.0
7.20	4541	4557	4574	4590	4606	4623	4639	4655	4672	4688	164.0
7.30	4705	4721	4738	4754	4771	4788	4804	4821	4838	4855	166.0
7.40	4871	4888	4905	4922	4939	4956	4973	4990	5007	5024	170.0
7.50	5041	5058	5075	5092	5109	5127	5144	5161	5178	5196	172.0
7.60	5213	5231	5248	5265	5283	5300	5318	5336	5353	5371	175.0
7.70	5388	5406	5424	5442	5459	5477	5495	5513	5531	5549	179.0
7.80	5567	5585	5603	5621	5639	5657	5675	5693	5711	5730	181.0
7.90	5748	5766	5784	5803	5821	5839	5858	5876	5895	5913	184.0
8.00	5932	5950	5969	5988	6006	6025	6044	6062	6081	6100	187.0
8.10	6119	6137	6156	6175	6194	6213	6232	6251	6270	6289	189.0
8.20	6308	6328	6347	6366	6385	6404	6424	6443	6462	6482	193.0
8.30	6501	6521	6540	6559	6579	6599	6618	6638	6657	6677	196.0
8.40	6697	6716	6736	6756	6776	6796	6815	6835	6855	6875	198.0
8.50	6895	6915	6935	6955	6975	6996	7016	7036	7056	7076	202.0
8.60	7097	7117	7137	7158	7178	7198	7219	7239	7260	7280	204.0
8.70	7301	7321	7342	7363	7383	7404	7425	7446	7466	7487	207.0
8.80	7508	7529	7550	7571	7592	7613	7634	7655	7676	7697	210.0
8.90	7718	7739	7760	7782	7803	7824	7846	7867	7888	7910	213.0
9.00	7931	7953	7974	7996	8017	8039	8060	8082	8104	8125	216.0
9.10	8147	8169	8191	8212	8234	8256	8278	8300	8322	8344	219.0
9.20	8366	8388	8410	8432	8454	8476	8498	8521	8543	8565	221.0
9.30	8587	8610	8632	8655	8677	8699	8722	8744	8767	8789	225.0
9.40	8812	8835	8857	8880	8903	8925	8948	8971	8994	9017	228.0
9.50	9040	9062	9085	9108	9131	9154	9177	9201	9224	9247	230.0
9.60	9270	9293	9316	9340	9363	9386	9410	9433	9456	9480	233.0
9.70	9503	9527	9550	9574	9597	9621	9645	9668	9692	9716	236.0
9.80	9739	9763	9787	9811	9835	9859	9882	9906	9930	9954	239.0
9.90	9978	10000	10030	10050	10070	10100	10120	10150	10170	10200	242.0
10.00	10220	10240	10270	10290	10320	10340	10370	10390	10420	10440	250.0
10.10	10470	10490	10510	10540	10560	10590	10610	10640	10660	10690	240.0
10.20	10710	10740	10760	10790	10810	10840	10860	10890	10910	10940	250.0

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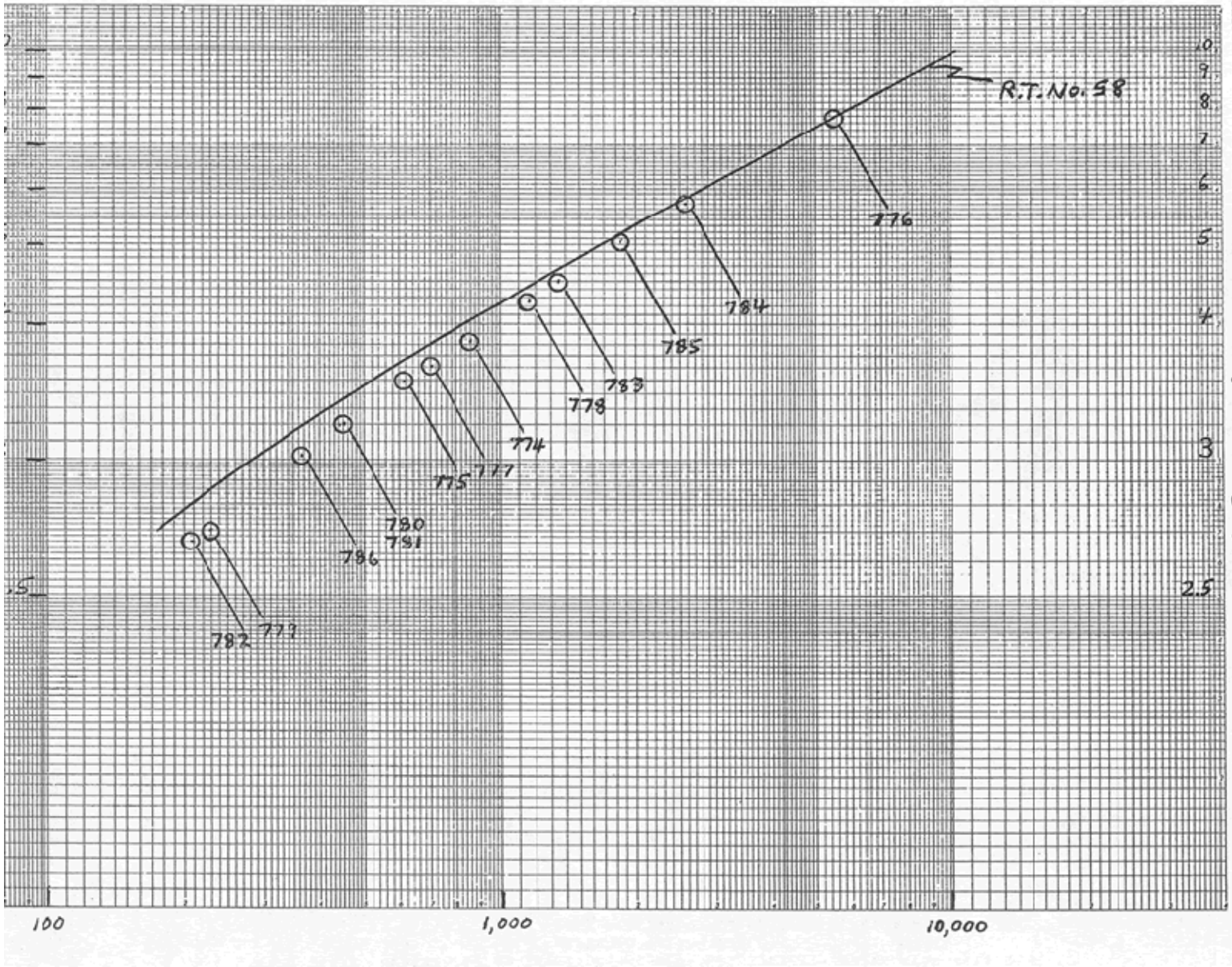
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