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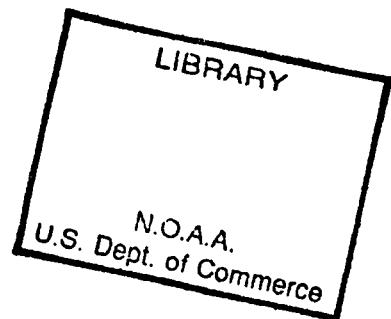
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STEEL TAPE MEASUREMENTS

Tables and Charts for Correction

By

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Preface

The tables and charts herein were developed to meet needs that arose in the Division of Photogrammetry while developing standardized procedures for traverse for the location of points to control photogrammetric mapping. An attempt is made to standardize the computations of corrections to lengths of traverse lines measured with steel tapes. Although these tables and charts are generally applicable to the use of any length of tape, they are specifically designed for use with 200-foot tapes. Third-order accuracy was the basic requirement for the traverses contemplated but corrections can be evaluated from these tables and charts with adequate accuracy for second-order.

This material was prepared under the direction of Comdr. Lawrence W. Swanson, Assistant Chief, Division of Photogrammetry. Table I and Table II were computed by punchcard methods in the Triangulation Section, Division of Geodesy.

The author wishes to thank Mr. Lansing G. Simmons, Chief Mathematician, Division of Geodesy, and numerous other members of the field and office forces of the U. S. Coast and Geodetic Survey for valuable suggestions and assistance.

RALPH MOORE BERRY

1 April 1954.

Introduction

A measured length is subject to the following corrections:

Standardization: The difference between the nominal length of the tape and its actual length as determined by calibration at the National Bureau of Standards, or by comparison with a tape that has been so calibrated. There is no provision herein for determination or application of this correction.

Support: The correction to the tape span due to a difference between the support condition used in the measurement and the support condition used at the time of calibration. If the tape is used under a calibrated support condition, this correction will not apply. A tape should be calibrated supported throughout under standard tension (20 pounds is current practice in the Coast and Geodetic Survey, but tapes already calibrated under other tensions may be corrected with these charts if the range of the charts is not exceeded) and also in catenary under the same tension. These charts are designed for current standard practice in the Coast and Geodetic Survey for catenary support of 200-foot tapes; that is, under two-point support for spans of 100 feet or less, but under three-point support (each end and midpoint) for spans of over 100 feet.

Temperature: The correction to the measured length due to the difference in the length of the tape at the standard temperature stated in the calibration record and its length at the temperature recorded at the time the field measurement was made.

Inclination: The correction to a length measured on a slope to reduce it to the equivalent horizontal length. The inclination is determined by level readings at the end points of support and thus determining a difference of elevation between the tape ends.

Sea Level: The correction to a measured length at some height above sea level to reduce it to its equivalent length if both ends were projected vertically to the mean sea level surface. This correction is not evaluated in this publication and may be neglected for surveys of accuracy less than 1 part in 10,000 if the average elevation is less than 500 feet. For further details concerning this correction, refer to Coast and Geodetic Survey Special Publication No. 247, *Manual of Geodetic Triangulation*, or, for a simplified presentation, to Special Publication No. 235, *The State Coordinate Systems*.

Scale Factor: The correction to a measured length to compensate for the inherent projection distortion of a state plane coordinate system. This correction, in general, may be neglected for surveys of accuracy less than 1 part in 10,000 and is not considered here. For further theory and details on this subject, refer to the various projection tables for the individual state coordinate systems (listed on p. 27) or to Special Publication No. 235, *The State Coordinate Systems*.

FIGURE 1

Nomogram For Calculation of Correction to Measured Length Due to Tape Catenary

The nomogram illustrated in Figure 1 can be used to evaluate the correction to a length measured with the tape in catenary. The diagram applies only to measurements made with a 200-foot tape used under standard catenary support conditions; that is, supported at the ends of the span only for distances of 100 feet or less or supported at the midpoint and ends of the span for distances of over 100 feet with the midsupport being on line and grade between the end supports. All measurements must be made at the same tension as the calibration. To obtain the basic data for an individual tape, calibration data must be available at the same tension for the actual length of the tape *at 200-foot span* both for the supported-throughout (flat) condition and for the standard catenary (three-point) support condition. The difference between these two values is the combined correction due to sag and elastic deformation, generally known by the single name of "catenary" correction. This combination is only effective if a constant standard tension is used for calibration and for all field measurements regardless of length of tape span.

Having the catenary correction thus evaluated for the total length of any individual 200-foot tape, it is easy by use of the nomogram to obtain the catenary correction for any subinterval of the tape. Procedure is as follows:

(1) Mark on scale *D* (left scale of nomogram) the catenary correction for the total 200-foot span of the individual tape. This point is used regardless of whether the subinterval to be corrected was less than 100 feet (two-point support) or more than 100 feet (three-point support).

(2) Select on scale *L* (right scale of nomogram) the length of the span to be corrected. For lengths up to and including 100 feet, the value will be found on the right-hand side of the scale; for values of over 100 feet, the left-hand side of the scale is to be used.

(3) Draw a straight line (or lay a transparent straight-edge) from the point on scale *D* to the point on scale *L*. Where this line crosses scale *C* (central scale of nomogram), read the value of the catenary correction to the length being considered. This correction is in thousandths of a foot and is always subtracted from the measured length.

**TAPE CATENARY CORRECTION
NOMOGRAM FOR
CALCULATION OF CORRECTION TO
MEASURED LENGTH DUE TO TAPE CATENARY**

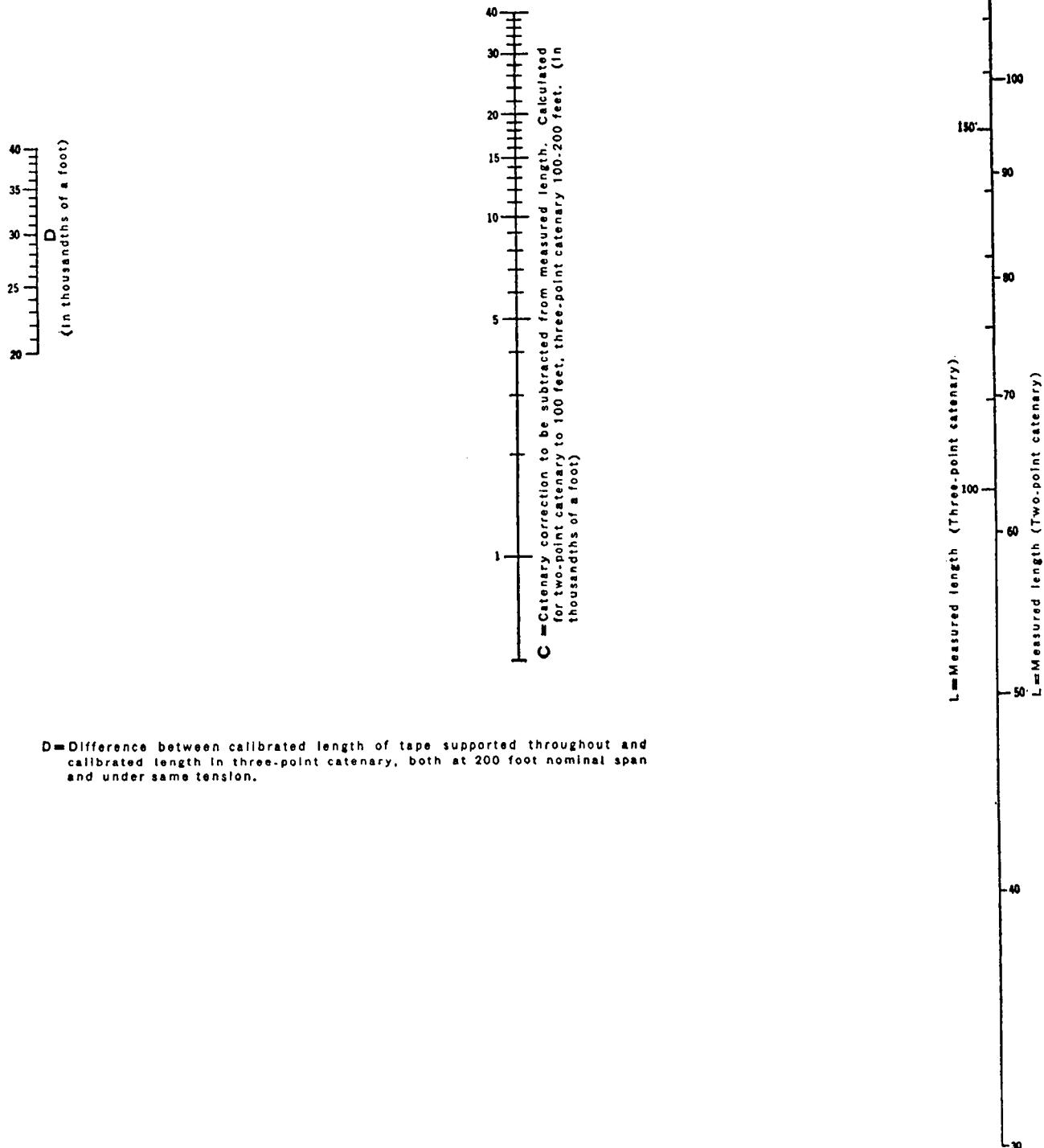


FIGURE 1.

FIGURE 2

Nomogram For Calculation of Temperature Correction to Lengths Measured With Steel Tapes

(Fahrenheit Temperatures)

If the field temperature has been observed at the time of measurement with a steel tape, it is possible to refine the measurement by application of a temperature correction. This correction is calculated from the formula:

$$C_T = 0.00000645 (T_F - 68)L$$

where

C_T = Temperature correction

T_F = Fahrenheit temperature

L = Measured length

The correction can be evaluated without calculation very rapidly from the nomogram as follows:

(1) Select on scale T_F (left scale of nomogram) the point corresponding to the mean observed temperature of the tape.

(2) Select on scale L (right scale of nomogram) the point corresponding to the measured length. Inclination and other corrections may be ignored for this purpose.

(3) Draw a straight line on the nomogram between the points selected above. Where this line crosses scale C (central scale of nomogram), read the numerical value of the correction in decimal parts of a foot. The sign of the correction is indicated by the position of the temperature value on the T_F scale. If it is on the left-hand side of the scale, the correction is positive, if on the right-hand side, the correction is negative. For temperatures whose values appear in parentheses on scale T_F , use one-tenth of the correction indicated on scale C .

**TEMPERATURE CORRECTION
NOMOGRAM FOR
CALCULATION OF TEMPERATURE CORRECTION
TO LENGTHS MEASURED WITH STEEL TAPES**

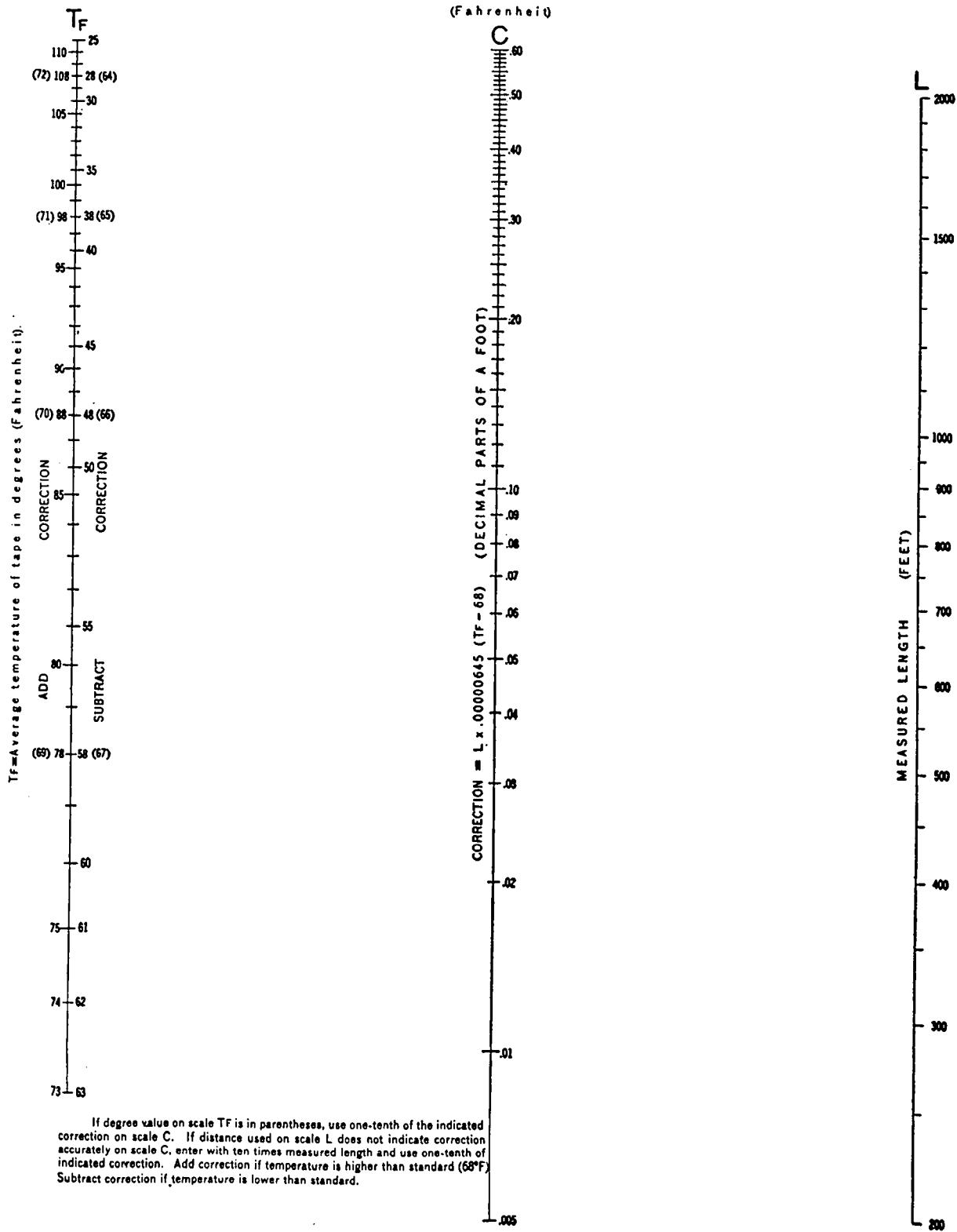


FIGURE 2.

FIGURE 3

Nomogram For Calculation of Temperature Correction to Lengths Measured With Steel Tapes

(Centigrade Temperatures)

The nomogram in Figure 3 is designed to facilitate the evaluation of temperature corrections to measurements made with steel tapes, with temperatures observed on the centigrade scale. The formula for calculation is:

$$C_T = 0.0000116 (T_c - 20)L$$

where

C_T =Temperature correction

T_c =Centigrade temperature

L =Measured length

The correction is evaluated from the nomogram using the same procedure described for Fahrenheit temperatures with Figure 2.

**TEMPERATURE CORRECTION
NOMOGRAM FOR
CALCULATION OF TEMPERATURE CORRECTION
TO LENGTHS MEASURED WITH STEEL TAPES**

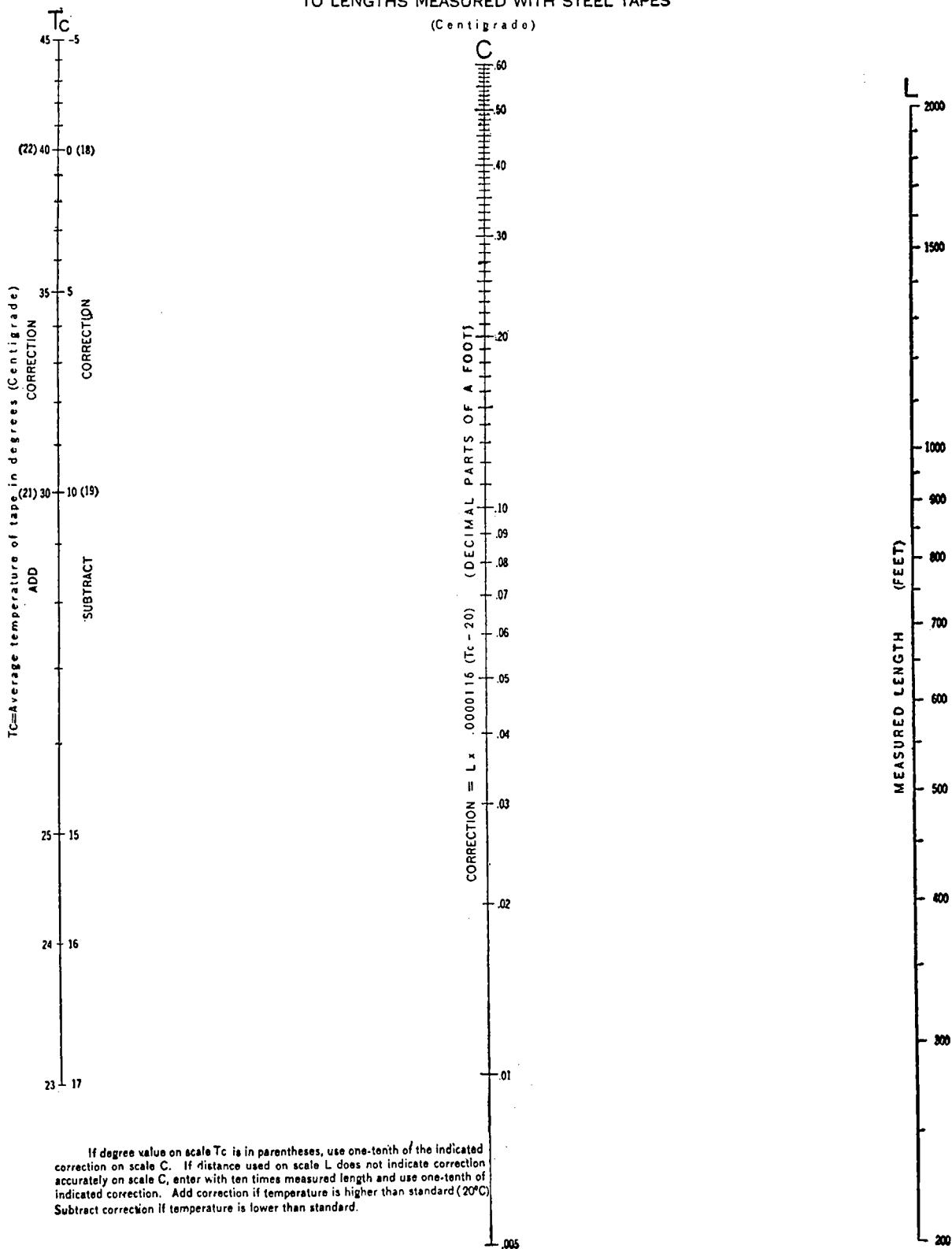


FIGURE 3.

TABLE I

Inclination Corrections For Tape Lengths Less Than 200 Feet

When a measurement is made with the tape inclined from the horizontal, it is necessary to reduce the measurement to the horizontal. Table I has been prepared for the computation of corrections to be subtracted from inclined measurements to reduce them to the horizontal. The difference in elevation between the ends of the inclined distance must be known.

The correction is calculated from an expanded binomial series, of which the first two terms are sufficient to evaluate the correction to the nearest thousandth of a foot if the inclinations do not exceed approximately 15 percent. Slopes in excess of 10 percent should be avoided in accurate surveys. The expression for the correction is:

$$C_I = -\left(\frac{H^2}{2L} + \frac{H^4}{8L^3} + \dots\right)$$

where

C_I =Inclination correction

H =Difference of elevation between ends
of inclined length

L =Inclined length

The calculation of the first term of the above series is facilitated by the use of Table I. Enter the table with the difference in elevation H and take out the corresponding value of **inclination correction**. This is the true value of the first term of the correction series if the inclined length is 100 feet. If the length is other than 100 feet, the value from the table must be divided by one-hundredth of the inclined length. The second term is obtained from the graph in Figure 4 which follows immediately after Table I. Note that, for slopes of less than 10 percent, the second term can be ignored.

Example 1: $L=180$ feet, $H=9.28$ feet (corr. from Table I= 0.431)

$$C_I = \frac{0.431}{1.80} = 0.239$$

Second term negligible

Example 2: $L=90$ feet, $H=11.56$ feet (corr. from Table I= 0.668)

$$C_I = \frac{0.668}{0.90} = 0.742$$

Second term from Figure 4= 0.003

Total correction= $(0.742 + 0.003) = -0.745$

For corrections to 200-foot spans, use Table II, page 17.

TABLE I

Tape Inclination Correction For 100-Foot Length

To obtain correction for any length, divide correction from this table, for proper elevation difference, by one-hundredth of the length and increase the correction by the second-term correction from the diagram (Fig. 4).

Inclination Correction

100-FOOT LENGTH

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.3	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
0.4	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
0.5	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
0.6	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.7	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
0.8	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004
0.9	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005
1.0	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
1.1	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007
1.2	0.007	0.007	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008
1.3	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.010
1.4	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1.5	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.013
1.6	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.014	0.014
1.7	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
1.8	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
1.9	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.020	0.020
2.0	0.020	0.020	0.020	0.021	0.021	0.021	0.021	0.021	0.022	0.022
2.1	0.022	0.022	0.022	0.023	0.023	0.023	0.023	0.024	0.024	0.024
2.2	0.024	0.024	0.025	0.025	0.025	0.025	0.026	0.026	0.026	0.026
2.3	0.026	0.027	0.027	0.027	0.027	0.028	0.028	0.028	0.028	0.029
2.4	0.029	0.029	0.030	0.030	0.030	0.030	0.030	0.031	0.031	0.031
2.5	0.031	0.032	0.032	0.032	0.032	0.033	0.033	0.033	0.033	0.034
2.6	0.034	0.034	0.034	0.035	0.035	0.035	0.035	0.036	0.036	0.036
2.7	0.036	0.037	0.037	0.037	0.038	0.038	0.038	0.038	0.039	0.039
2.8	0.039	0.039	0.040	0.040	0.040	0.041	0.041	0.041	0.041	0.042
2.9	0.042	0.042	0.043	0.043	0.043	0.044	0.044	0.044	0.044	0.045
3.0	0.045	0.045	0.046	0.046	0.046	0.047	0.047	0.047	0.047	0.048
3.1	0.048	0.048	0.049	0.049	0.049	0.050	0.050	0.050	0.051	0.051
3.2	0.051	0.052	0.052	0.052	0.052	0.053	0.053	0.053	0.054	0.054
3.3	0.054	0.055	0.055	0.055	0.056	0.056	0.056	0.057	0.057	0.057
3.4	0.058	0.058	0.059	0.059	0.059	0.060	0.060	0.060	0.061	0.061
3.5	0.061	0.062	0.062	0.063	0.063	0.063	0.064	0.064	0.064	0.064
3.6	0.065	0.065	0.066	0.066	0.066	0.067	0.067	0.067	0.068	0.068
3.7	0.068	0.069	0.069	0.070	0.070	0.070	0.071	0.071	0.071	0.072
3.8	0.072	0.073	0.073	0.073	0.074	0.074	0.074	0.075	0.075	0.076
3.9	0.076	0.076	0.077	0.077	0.078	0.078	0.078	0.079	0.079	0.080
4.0	0.080	0.080	0.081	0.081	0.082	0.082	0.082	0.083	0.083	0.084
4.1	0.084	0.084	0.085	0.085	0.086	0.086	0.087	0.087	0.087	0.088
4.2	0.088	0.089	0.089	0.089	0.090	0.090	0.091	0.091	0.092	0.092
4.3	0.092	0.093	0.093	0.094	0.094	0.095	0.095	0.095	0.096	0.096
4.4	0.097	0.097	0.098	0.098	0.099	0.099	0.099	0.100	0.100	0.101
4.5	0.101	0.102	0.102	0.103	0.103	0.104	0.104	0.104	0.105	0.105
4.6	0.106	0.106	0.107	0.107	0.108	0.108	0.109	0.109	0.110	0.110
4.7	0.110	0.111	0.111	0.112	0.112	0.113	0.113	0.114	0.114	0.115
4.8	0.115	0.116	0.116	0.117	0.117	0.118	0.118	0.119	0.119	0.120
4.9	0.120	0.121	0.121	0.122	0.122	0.123	0.123	0.124	0.124	0.125
5.0	0.125	0.126	0.126	0.127	0.127	0.128	0.128	0.129	0.129	0.130

Inclination Correction

100-FOOT LENGTH

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5. 0	0.125	0.126	0.126	0.127	0.127	0.128	0.128	0.129	0.129	0.130
5. 1	0.130	0.131	0.131	0.132	0.132	0.133	0.133	0.134	0.134	0.135
5. 2	0.135	0.136	0.136	0.137	0.137	0.138	0.138	0.139	0.139	0.140
5. 3	0.140	0.141	0.142	0.142	0.143	0.143	0.144	0.144	0.145	0.145
5. 4	0.146	0.146	0.147	0.147	0.148	0.149	0.149	0.150	0.150	0.151
5. 5	0.151	0.152	0.152	0.153	0.153	0.154	0.155	0.155	0.156	0.156
5. 6	0.157	0.157	0.158	0.158	0.159	0.160	0.160	0.161	0.161	0.162
5. 7	0.162	0.163	0.164	0.164	0.165	0.165	0.166	0.166	0.167	0.168
5. 8	0.168	0.169	0.169	0.170	0.171	0.171	0.172	0.172	0.173	0.173
5. 9	0.174	0.175	0.175	0.176	0.176	0.177	0.178	0.178	0.179	0.179
6. 0	0.180	0.181	0.181	0.182	0.182	0.183	0.184	0.184	0.185	0.185
6. 1	0.186	0.187	0.187	0.188	0.188	0.189	0.190	0.190	0.191	0.192
6. 2	0.192	0.193	0.193	0.194	0.195	0.195	0.196	0.197	0.197	0.198
6. 3	0.198	0.199	0.200	0.200	0.201	0.202	0.202	0.203	0.204	0.204
6. 4	0.205	0.205	0.206	0.207	0.207	0.208	0.209	0.209	0.210	0.211
6. 5	0.211	0.212	0.213	0.213	0.214	0.215	0.215	0.216	0.216	0.217
6. 6	0.218	0.218	0.219	0.220	0.220	0.221	0.222	0.222	0.223	0.224
6. 7	0.224	0.225	0.226	0.226	0.227	0.228	0.228	0.229	0.230	0.231
6. 8	0.231	0.232	0.233	0.233	0.234	0.235	0.235	0.236	0.237	0.237
6. 9	0.238	0.239	0.239	0.240	0.241	0.242	0.242	0.243	0.244	0.244
7. 0	0.245	0.246	0.246	0.247	0.248	0.249	0.249	0.250	0.251	0.251
7. 1	0.252	0.253	0.253	0.254	0.255	0.257	0.256	0.257	0.258	0.258
7. 2	0.259	0.260	0.261	0.261	0.262	0.263	0.264	0.264	0.265	0.266
7. 3	0.266	0.267	0.268	0.269	0.269	0.270	0.271	0.272	0.272	0.273
7. 4	0.274	0.275	0.275	0.276	0.277	0.278	0.278	0.279	0.280	0.281
7. 5	0.281	0.282	0.283	0.284	0.284	0.285	0.286	0.287	0.287	0.288
7. 6	0.289	0.290	0.290	0.291	0.292	0.293	0.293	0.294	0.295	0.296
7. 7	0.296	0.297	0.298	0.299	0.300	0.300	0.301	0.302	0.303	0.303
7. 8	0.304	0.305	0.306	0.307	0.307	0.308	0.309	0.310	0.310	0.311
7. 9	0.312	0.313	0.314	0.314	0.315	0.316	0.317	0.318	0.318	0.319
8. 0	0.320	0.321	0.322	0.322	0.323	0.324	0.325	0.326	0.326	0.327
8. 1	0.328	0.329	0.330	0.330	0.331	0.332	0.333	0.334	0.335	0.335
8. 2	0.336	0.337	0.338	0.339	0.339	0.340	0.341	0.342	0.343	0.344
8. 3	0.344	0.345	0.346	0.347	0.348	0.349	0.349	0.350	0.351	0.352
8. 4	0.353	0.354	0.354	0.355	0.356	0.357	0.358	0.359	0.360	0.360
8. 5	0.361	0.362	0.363	0.364	0.365	0.366	0.366	0.367	0.368	0.369
8. 6	0.370	0.371	0.372	0.372	0.373	0.374	0.375	0.376	0.377	0.378
8. 7	0.378	0.379	0.380	0.381	0.382	0.383	0.384	0.385	0.385	0.386
8. 8	0.387	0.388	0.389	0.390	0.391	0.392	0.392	0.393	0.394	0.395
8. 9	0.396	0.397	0.398	0.399	0.400	0.401	0.401	0.402	0.403	0.404
9. 0	0.405	0.406	0.407	0.408	0.409	0.410	0.410	0.411	0.412	0.413
9. 1	0.414	0.415	0.416	0.417	0.418	0.419	0.420	0.420	0.421	0.422
9. 2	0.423	0.424	0.425	0.426	0.427	0.428	0.429	0.430	0.431	0.432
9. 3	0.432	0.433	0.434	0.435	0.436	0.437	0.438	0.439	0.440	0.441
9. 4	0.442	0.443	0.444	0.445	0.446	0.447	0.447	0.448	0.449	0.450
9. 5	0.451	0.452	0.453	0.454	0.455	0.456	0.457	0.458	0.459	0.460
9. 6	0.461	0.462	0.463	0.464	0.465	0.466	0.467	0.468	0.469	0.469
9. 7	0.470	0.471	0.472	0.473	0.474	0.475	0.476	0.477	0.478	0.479
9. 8	0.480	0.481	0.482	0.483	0.484	0.485	0.486	0.487	0.488	0.489
9. 9	0.490	0.491	0.492	0.493	0.494	0.495	0.496	0.497	0.498	0.499
10. 0	0.500	0.501	0.502	0.503	0.504	0.505	0.506	0.507	0.508	0.509

Inclination Correction

100-FOOT LENGTH

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
10. 0	0. 500	0. 501	0. 502	0. 503	0. 504	0. 505	0. 506	0. 507	0. 508	0. 509
10. 1	0. 510	0. 511	0. 512	0. 513	0. 514	0. 515	0. 516	0. 517	0. 518	0. 519
10. 2	0. 520	0. 521	0. 522	0. 523	0. 524	0. 525	0. 526	0. 527	0. 528	0. 529
10. 3	0. 530	0. 531	0. 532	0. 533	0. 534	0. 535	0. 536	0. 537	0. 538	0. 539
10. 4	0. 541	0. 542	0. 543	0. 544	0. 545	0. 546	0. 547	0. 548	0. 549	0. 550
10. 5	0. 551	0. 552	0. 553	0. 554	0. 555	0. 557	0. 558	0. 559	0. 560	0. 561
10. 6	0. 562	0. 563	0. 564	0. 565	0. 566	0. 567	0. 568	0. 569	0. 570	0. 571
10. 7	0. 572	0. 574	0. 575	0. 576	0. 577	0. 578	0. 579	0. 580	0. 581	0. 582
10. 8	0. 583	0. 584	0. 585	0. 586	0. 588	0. 589	0. 590	0. 591	0. 592	0. 593
10. 9	0. 594	0. 595	0. 596	0. 597	0. 598	0. 600	0. 601	0. 602	0. 603	0. 604
11. 0	0. 605	0. 606	0. 607	0. 608	0. 609	0. 611	0. 612	0. 613	0. 614	0. 615
11. 1	0. 616	0. 617	0. 618	0. 619	0. 620	0. 622	0. 623	0. 624	0. 625	0. 626
11. 2	0. 627	0. 628	0. 629	0. 631	0. 632	0. 633	0. 634	0. 635	0. 636	0. 637
11. 3	0. 638	0. 640	0. 641	0. 642	0. 643	0. 644	0. 645	0. 646	0. 648	0. 649
11. 4	0. 650	0. 651	0. 652	0. 653	0. 654	0. 656	0. 657	0. 658	0. 659	0. 660
11. 5	0. 661	0. 662	0. 664	0. 665	0. 666	0. 667	0. 668	0. 669	0. 670	0. 672
11. 6	0. 673	0. 674	0. 675	0. 676	0. 677	0. 679	0. 680	0. 681	0. 682	0. 683
11. 7	0. 684	0. 686	0. 687	0. 688	0. 689	0. 690	0. 691	0. 693	0. 694	0. 695
11. 8	0. 696	0. 697	0. 699	0. 700	0. 701	0. 702	0. 703	0. 704	0. 706	0. 707
11. 9	0. 708	0. 709	0. 710	0. 712	0. 713	0. 714	0. 715	0. 716	0. 718	0. 719
12. 0	0. 720	0. 721	0. 722	0. 724	0. 725	0. 726	0. 727	0. 728	0. 730	0. 731
12. 1	0. 732	0. 733	0. 734	0. 736	0. 737	0. 738	0. 739	0. 741	0. 742	0. 743
12. 2	0. 744	0. 745	0. 747	0. 748	0. 749	0. 750	0. 752	0. 753	0. 754	0. 755
12. 3	0. 756	0. 758	0. 759	0. 760	0. 761	0. 763	0. 764	0. 765	0. 766	0. 768
12. 4	0. 769	0. 770	0. 771	0. 773	0. 774	0. 775	0. 776	0. 778	0. 779	0. 780
12. 5	0. 781	0. 783	0. 784	0. 785	0. 786	0. 788	0. 789	0. 790	0. 791	0. 793
12. 6	0. 794	0. 795	0. 796	0. 798	0. 799	0. 800	0. 801	0. 803	0. 804	0. 805
12. 7	0. 806	0. 808	0. 809	0. 810	0. 812	0. 813	0. 814	0. 815	0. 817	0. 818
12. 8	0. 819	0. 820	0. 822	0. 823	0. 824	0. 826	0. 827	0. 828	0. 829	0. 831
12. 9	0. 832	0. 833	0. 835	0. 836	0. 837	0. 839	0. 840	0. 841	0. 842	0. 844
13. 0	0. 845	0. 846	0. 848	0. 849	0. 850	0. 852	0. 853	0. 854	0. 855	0. 857
13. 1	0. 858	0. 859	0. 861	0. 862	0. 863	0. 865	0. 866	0. 867	0. 869	0. 870
13. 2	0. 871	0. 873	0. 874	0. 875	0. 876	0. 878	0. 879	0. 880	0. 882	0. 883
13. 3	0. 884	0. 886	0. 887	0. 888	0. 890	0. 891	0. 892	0. 894	0. 895	0. 896
13. 4	0. 898	0. 899	0. 900	0. 902	0. 903	0. 905	0. 906	0. 907	0. 909	0. 910
13. 5	0. 911	0. 913	0. 914	0. 915	0. 917	0. 918	0. 919	0. 921	0. 922	0. 923
13. 6	0. 925	0. 926	0. 928	0. 929	0. 930	0. 932	0. 933	0. 934	0. 936	0. 937
13. 7	0. 938	0. 940	0. 941	0. 943	0. 944	0. 945	0. 947	0. 948	0. 949	0. 951
13. 8	0. 952	0. 954	0. 955	0. 956	0. 958	0. 959	0. 960	0. 962	0. 963	0. 965
13. 9	0. 966	0. 967	0. 969	0. 970	0. 972	0. 973	0. 974	0. 976	0. 977	0. 979
14. 0	0. 980	0. 981	0. 983	0. 984	0. 986	0. 987	0. 988	0. 990	0. 991	0. 993
14. 1	0. 994	0. 995	0. 997	0. 998	1. 000	1. 001	1. 003	1. 004	1. 005	1. 007
14. 2	1. 008	1. 010	1. 011	1. 012	1. 014	1. 015	1. 017	1. 018	1. 020	1. 021
14. 3	1. 022	1. 024	1. 025	1. 027	1. 028	1. 030	1. 031	1. 032	1. 034	1. 035
14. 4	1. 037	1. 038	1. 040	1. 041	1. 043	1. 044	1. 045	1. 047	1. 048	1. 050
14. 5	1. 051	1. 053	1. 054	1. 056	1. 057	1. 059	1. 060	1. 061	1. 063	1. 064
14. 6	1. 066	1. 067	1. 069	1. 070	1. 072	1. 073	1. 075	1. 076	1. 078	1. 079
14. 7	1. 080	1. 082	1. 083	1. 085	1. 086	1. 088	1. 089	1. 091	1. 092	1. 094
14. 8	1. 095	1. 097	1. 098	1. 100	1. 101	1. 103	1. 104	1. 106	1. 107	1. 109
14. 9	1. 110	1. 112	1. 113	1. 115	1. 116	1. 118	1. 119	1. 121	1. 122	1. 124
15. 0	1. 125	1. 127	1. 128	1. 130	1. 131	1. 133	1. 134	1. 136	1. 137	1. 139

Inclination Correction

100-FOOT LENGTH

FIGURE 4

Tape Inclination Correction

Evaluation of Second Term

The graph in Figure 4 permits the evaluation of the second term of the inclination correction described in the text preceding Table I. This second term is small and may be neglected when the slope is less than approximately 10 percent, and is less than approximately one-hundredth of a foot for slopes less than 15 percent. Within the shaded area on the graph the term is less than 0.0005 foot.

The term is evaluated to the nearest thousandth of a foot as labeled in the space between the curves delineating each value. To use the chart, intersect the ordinate corresponding to the slope measurement with the abscissa corresponding to the difference in elevation between the tape ends. Read the value in the space where the intersection falls.

Example: $L=120$ feet, $H=15.3$ feet; second term of slope correction = -0.004 foot. The second term is always added numerically to the first term obtained from Table I; that is, it will always increase the total slope correction.

STEEL TAPE MEASUREMENTS

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H = Difference of elevation between ends of measured length.

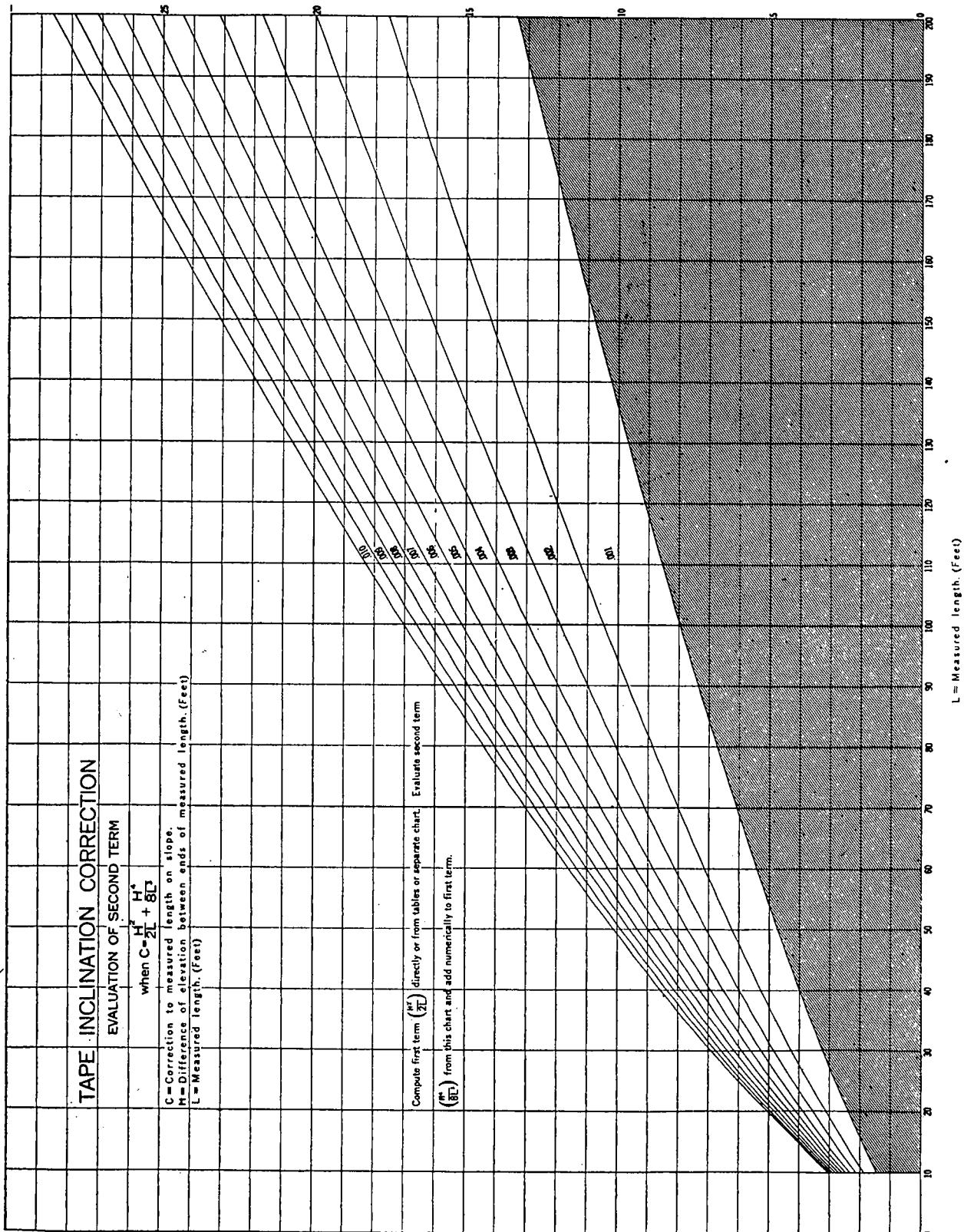


FIGURE 4.

TABLE II

Tape Inclination Correction For 200-Foot Length

Table II lists the inclination corrections for slope measurements made in full 200-foot spans. Both terms of the series are included in the computation and no further operation is necessary to obtain the complete correction. Figure 4 is not to be used in conjunction with Table II.

This table should be used for 200-foot lengths only. For other lengths, use Table I and Figure 4 as instructed.

Inclination Correction

200-FOOT LENGTH .

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0. 0	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
0. 1	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
0. 2	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
0. 3	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
0. 4	0. 000	0. 000	0. 000	0. 000	0. 000	0. 001	0. 001	0. 001	0. 001	0. 001
0. 5	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001
0. 6	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001
0. 7	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 002	0. 002
0. 8	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002
0. 9	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002	0. 002
1. 0	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003
1. 1	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 003	0. 004
1. 2	0. 004	0. 004	0. 004	0. 004	0. 004	0. 004	0. 004	0. 004	0. 004	0. 004
1. 3	0. 004	0. 004	0. 004	0. 004	0. 004	0. 005	0. 005	0. 005	0. 005	0. 005
1. 4	0. 005	0. 005	0. 005	0. 005	0. 005	0. 005	0. 005	0. 005	0. 005	0. 006
1. 5	0. 006	0. 006	0. 006	0. 006	0. 006	0. 006	0. 006	0. 006	0. 006	0. 006
1. 6	0. 006	0. 006	0. 007	0. 007	0. 007	0. 007	0. 007	0. 007	0. 007	0. 007
1. 7	0. 007	0. 007	0. 007	0. 007	0. 008	0. 008	0. 008	0. 008	0. 008	0. 008
1. 8	0. 008	0. 008	0. 008	0. 008	0. 008	0. 009	0. 009	0. 009	0. 009	0. 009
1. 9	0. 009	0. 009	0. 009	0. 009	0. 009	0. 010	0. 010	0. 010	0. 010	0. 010
2. 0	0. 010	0. 010	0. 010	0. 010	0. 010	0. 011	0. 011	0. 011	0. 011	0. 011
2. 1	0. 011	0. 011	0. 011	0. 011	0. 011	0. 012	0. 012	0. 012	0. 012	0. 012
2. 2	0. 012	0. 012	0. 012	0. 012	0. 013	0. 013	0. 013	0. 013	0. 013	0. 013
2. 3	0. 013	0. 013	0. 013	0. 014	0. 014	0. 014	0. 014	0. 014	0. 014	0. 014
2. 4	0. 014	0. 015	0. 015	0. 015	0. 015	0. 015	0. 015	0. 015	0. 015	0. 016
2. 5	0. 016	0. 016	0. 016	0. 016	0. 016	0. 016	0. 016	0. 017	0. 017	0. 017
2. 6	0. 017	0. 017	0. 017	0. 017	0. 017	0. 018	0. 018	0. 018	0. 018	0. 018
2. 7	0. 018	0. 018	0. 018	0. 019	0. 019	0. 019	0. 019	0. 019	0. 019	0. 019
2. 8	0. 020	0. 020	0. 020	0. 020	0. 020	0. 020	0. 020	0. 021	0. 021	0. 021
2. 9	0. 021	0. 021	0. 021	0. 021	0. 022	0. 022	0. 022	0. 022	0. 022	0. 022
3. 0	0. 023	0. 023	0. 023	0. 023	0. 023	0. 023	0. 023	0. 024	0. 024	0. 024
3. 1	0. 024	0. 024	0. 024	0. 024	0. 025	0. 025	0. 025	0. 025	0. 025	0. 025
3. 2	0. 026	0. 026	0. 026	0. 026	0. 026	0. 026	0. 027	0. 027	0. 027	0. 027
3. 3	0. 027	0. 027	0. 028	0. 028	0. 028	0. 028	0. 028	0. 028	0. 029	0. 029
3. 4	0. 029	0. 029	0. 029	0. 030	0. 030	0. 030	0. 030	0. 030	0. 030	0. 030
3. 5	0. 031	0. 031	0. 031	0. 031	0. 031	0. 032	0. 032	0. 032	0. 032	0. 032
3. 6	0. 032	0. 033	0. 033	0. 033	0. 033	0. 033	0. 033	0. 034	0. 034	0. 034
3. 7	0. 034	0. 034	0. 035	0. 035	0. 035	0. 035	0. 035	0. 036	0. 036	0. 036
3. 8	0. 036	0. 036	0. 036	0. 037	0. 037	0. 037	0. 037	0. 037	0. 038	0. 038
3. 9	0. 038	0. 038	0. 038	0. 039	0. 039	0. 039	0. 039	0. 040	0. 040	0. 040
4. 0	0. 040	0. 040	0. 040	0. 041	0. 041	0. 041	0. 041	0. 041	0. 042	0. 042
4. 1	0. 042	0. 042	0. 042	0. 043	0. 043	0. 043	0. 043	0. 043	0. 044	0. 044
4. 2	0. 044	0. 044	0. 045	0. 045	0. 045	0. 045	0. 045	0. 046	0. 046	0. 046
4. 3	0. 046	0. 046	0. 047	0. 047	0. 047	0. 047	0. 048	0. 048	0. 048	0. 048
4. 4	0. 048	0. 049	0. 049	0. 049	0. 049	0. 050	0. 050	0. 050	0. 050	0. 050
4. 5	0. 051	0. 051	0. 051	0. 051	0. 052	0. 052	0. 052	0. 052	0. 052	0. 053
4. 6	0. 053	0. 053	0. 053	0. 054	0. 054	0. 054	0. 054	0. 055	0. 055	0. 055
4. 7	0. 055	0. 055	0. 056	0. 056	0. 056	0. 056	0. 057	0. 057	0. 057	0. 057
4. 8	0. 058	0. 058	0. 058	0. 058	0. 059	0. 059	0. 059	0. 060	0. 060	0. 060
4. 9	0. 060	0. 060	0. 061	0. 061	0. 061	0. 061	0. 062	0. 062	0. 062	0. 062
5. 0	0. 063	0. 063	0. 063	0. 063	0. 064	0. 064	0. 064	0. 065	0. 065	0. 065

Inclination Correction

200-FOOT LENGTH

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5. 0	0. 063	0. 063	0. 063	0. 063	0. 064	0. 064	0. 064	0. 064	0. 065	0. 065
5. 1	0. 065	0. 065	0. 066	0. 066	0. 066	0. 066	0. 067	0. 067	0. 067	0. 067
5. 2	0. 068	0. 068	0. 068	0. 068	0. 069	0. 069	0. 069	0. 069	0. 070	0. 070
5. 3	0. 070	0. 071	0. 071	0. 071	0. 071	0. 072	0. 072	0. 072	0. 072	0. 073
5. 4	0. 073	0. 073	0. 073	0. 074	0. 074	0. 074	0. 075	0. 075	0. 075	0. 075
5. 5	0. 076	0. 076	0. 076	0. 076	0. 077	0. 077	0. 077	0. 078	0. 078	0. 078
5. 6	0. 078	0. 079	0. 079	0. 079	0. 080	0. 080	0. 080	0. 080	0. 081	0. 081
5. 7	0. 081	0. 082	0. 082	0. 082	0. 082	0. 083	0. 083	0. 083	0. 084	0. 084
5. 8	0. 084	0. 084	0. 085	0. 085	0. 085	0. 086	0. 086	0. 086	0. 086	0. 087
5. 9	0. 087	0. 087	0. 088	0. 088	0. 088	0. 089	0. 089	0. 089	0. 089	0. 090
6. 0	0. 090	0. 090	0. 091	0. 091	0. 091	0. 092	0. 092	0. 092	0. 092	0. 093
6. 1	0. 093	0. 093	0. 094	0. 094	0. 094	0. 095	0. 095	0. 095	0. 096	0. 096
6. 2	0. 096	0. 096	0. 097	0. 097	0. 097	0. 098	0. 098	0. 098	0. 099	0. 099
6. 3	0. 099	0. 100	0. 100	0. 100	0. 101	0. 101	0. 101	0. 101	0. 102	0. 102
6. 4	0. 102	0. 103	0. 103	0. 103	0. 104	0. 104	0. 104	0. 105	0. 105	0. 105
6. 5	0. 106	0. 106	0. 106	0. 107	0. 107	0. 107	0. 108	0. 108	0. 108	0. 109
6. 6	0. 109	0. 109	0. 110	0. 110	0. 110	0. 111	0. 111	0. 111	0. 112	0. 112
6. 7	0. 112	0. 113	0. 113	0. 113	0. 114	0. 114	0. 114	0. 115	0. 115	0. 115
6. 8	0. 116	0. 116	0. 116	0. 117	0. 117	0. 117	0. 118	0. 118	0. 118	0. 119
6. 9	0. 119	0. 119	0. 120	0. 120	0. 120	0. 121	0. 121	0. 121	0. 122	0. 122
7. 0	0. 123	0. 123	0. 123	0. 124	0. 124	0. 124	0. 125	0. 125	0. 125	0. 126
7. 1	0. 126	0. 126	0. 127	0. 127	0. 127	0. 128	0. 128	0. 129	0. 129	0. 129
7. 2	0. 130	0. 130	0. 130	0. 131	0. 131	0. 131	0. 132	0. 132	0. 133	0. 133
7. 3	0. 133	0. 134	0. 134	0. 134	0. 135	0. 135	0. 135	0. 136	0. 136	0. 137
7. 4	0. 137	0. 137	0. 138	0. 138	0. 138	0. 139	0. 139	0. 140	0. 140	0. 140
7. 5	0. 141	0. 141	0. 141	0. 142	0. 142	0. 143	0. 143	0. 143	0. 144	0. 144
7. 6	0. 144	0. 145	0. 145	0. 146	0. 146	0. 146	0. 147	0. 147	0. 148	0. 148
7. 7	0. 148	0. 149	0. 149	0. 149	0. 150	0. 150	0. 151	0. 151	0. 151	0. 152
7. 8	0. 152	0. 153	0. 153	0. 153	0. 154	0. 154	0. 155	0. 155	0. 155	0. 156
7. 9	0. 156	0. 156	0. 157	0. 157	0. 158	0. 158	0. 158	0. 159	0. 159	0. 160
8. 0	0. 160	0. 160	0. 161	0. 161	0. 162	0. 162	0. 162	0. 163	0. 163	0. 164
8. 1	0. 164	0. 164	0. 165	0. 165	0. 166	0. 166	0. 167	0. 167	0. 167	0. 168
8. 2	0. 168	0. 169	0. 169	0. 169	0. 170	0. 170	0. 171	0. 171	0. 171	0. 172
8. 3	0. 172	0. 173	0. 173	0. 174	0. 174	0. 174	0. 175	0. 175	0. 176	0. 176
8. 4	0. 176	0. 177	0. 177	0. 178	0. 178	0. 179	0. 179	0. 179	0. 180	0. 180
8. 5	0. 181	0. 181	0. 182	0. 182	0. 182	0. 183	0. 183	0. 184	0. 184	0. 185
8. 6	0. 185	0. 185	0. 186	0. 186	0. 187	0. 187	0. 188	0. 188	0. 188	0. 189
8. 7	0. 189	0. 190	0. 190	0. 191	0. 191	0. 191	0. 192	0. 192	0. 193	0. 193
8. 8	0. 194	0. 194	0. 195	0. 195	0. 195	0. 196	0. 196	0. 197	0. 197	0. 198
8. 9	0. 198	0. 199	0. 199	0. 199	0. 200	0. 200	0. 201	0. 201	0. 202	0. 202
9. 0	0. 203	0. 203	0. 204	0. 204	0. 204	0. 205	0. 205	0. 206	0. 206	0. 207
9. 1	0. 207	0. 208	0. 208	0. 209	0. 209	0. 209	0. 210	0. 210	0. 211	0. 211
9. 2	0. 212	0. 212	0. 213	0. 213	0. 214	0. 214	0. 214	0. 215	0. 215	0. 216
9. 3	0. 216	0. 217	0. 217	0. 218	0. 218	0. 219	0. 219	0. 220	0. 220	0. 221
9. 4	0. 221	0. 221	0. 222	0. 222	0. 223	0. 223	0. 224	0. 224	0. 225	0. 225
9. 5	0. 226	0. 226	0. 227	0. 227	0. 228	0. 228	0. 229	0. 229	0. 230	0. 235
9. 6	0. 231	0. 231	0. 231	0. 232	0. 232	0. 233	0. 233	0. 234	0. 234	0. 230
9. 7	0. 235	0. 236	0. 236	0. 237	0. 237	0. 238	0. 238	0. 239	0. 239	0. 240
9. 8	0. 240	0. 241	0. 241	0. 242	0. 242	0. 243	0. 243	0. 244	0. 244	0. 245
9. 9	0. 245	0. 246	0. 246	0. 247	0. 247	0. 248	0. 248	0. 249	0. 249	0. 250
10. 0	0. 250	0. 251	0. 251	0. 252	0. 252	0. 253	0. 253	0. 254	0. 254	0. 255

Inclination Correction

200-FOOT LENGTH

H	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
10. 0	0. 250	0. 251	0. 251	0. 252	0. 252	0. 253	0. 253	0. 254	0. 254	0. 255
10. 1	0. 255	0. 256	0. 256	0. 257	0. 257	0. 258	0. 258	0. 259	0. 259	0. 260
10. 2	0. 260	0. 261	0. 261	0. 262	0. 262	0. 263	0. 263	0. 264	0. 264	0. 265
10. 3	0. 265	0. 266	0. 266	0. 267	0. 267	0. 268	0. 269	0. 269	0. 270	0. 270
10. 4	0. 271	0. 271	0. 272	0. 272	0. 273	0. 273	0. 274	0. 274	0. 275	0. 275
10. 5	0. 276	0. 276	0. 277	0. 277	0. 278	0. 278	0. 279	0. 280	0. 280	0. 281
10. 6	0. 281	0. 282	0. 282	0. 283	0. 283	0. 284	0. 284	0. 285	0. 285	0. 286
10. 7	0. 286	0. 287	0. 288	0. 288	0. 289	0. 289	0. 290	0. 290	0. 291	0. 291
10. 8	0. 292	0. 292	0. 293	0. 293	0. 294	0. 295	0. 295	0. 296	0. 296	0. 297
10. 9	0. 297	0. 298	0. 298	0. 299	0. 299	0. 300	0. 301	0. 301	0. 302	0. 302
11. 0	0. 303	0. 303	0. 304	0. 304	0. 305	0. 305	0. 306	0. 307	0. 307	0. 308
11. 1	0. 308	0. 309	0. 309	0. 310	0. 310	0. 311	0. 312	0. 312	0. 313	0. 313
11. 2	0. 314	0. 314	0. 315	0. 316	0. 316	0. 317	0. 317	0. 318	0. 318	0. 319
11. 3	0. 319	0. 320	0. 321	0. 321	0. 322	0. 322	0. 323	0. 323	0. 324	0. 325
11. 4	0. 325	0. 326	0. 326	0. 327	0. 327	0. 328	0. 329	0. 329	0. 330	0. 330
11. 5	0. 331	0. 331	0. 332	0. 333	0. 333	0. 334	0. 334	0. 335	0. 336	0. 336
11. 6	0. 337	0. 337	0. 338	0. 338	0. 339	0. 340	0. 340	0. 341	0. 341	0. 342
11. 7	0. 343	0. 343	0. 344	0. 344	0. 345	0. 345	0. 346	0. 347	0. 347	0. 348
11. 8	0. 348	0. 349	0. 350	0. 350	0. 351	0. 351	0. 352	0. 353	0. 353	0. 354
11. 9	0. 354	0. 355	0. 356	0. 356	0. 357	0. 357	0. 358	0. 359	0. 359	0. 360
12. 0	0. 360	0. 361	0. 362	0. 362	0. 363	0. 363	0. 364	0. 365	0. 365	0. 366
12. 1	0. 366	0. 367	0. 368	0. 368	0. 369	0. 369	0. 370	0. 370	0. 371	0. 372
12. 2	0. 372	0. 373	0. 374	0. 374	0. 375	0. 376	0. 376	0. 377	0. 377	0. 378
12. 3	0. 379	0. 379	0. 380	0. 380	0. 381	0. 382	0. 382	0. 383	0. 384	0. 384
12. 4	0. 385	0. 385	0. 386	0. 387	0. 387	0. 388	0. 389	0. 389	0. 390	0. 390
12. 5	0. 391	0. 392	0. 392	0. 393	0. 394	0. 394	0. 395	0. 395	0. 396	0. 397
12. 6	0. 397	0. 398	0. 399	0. 399	0. 400	0. 400	0. 401	0. 402	0. 402	0. 403
12. 7	0. 404	0. 404	0. 405	0. 406	0. 406	0. 407	0. 407	0. 408	0. 409	0. 409
12. 8	0. 410	0. 411	0. 411	0. 412	0. 413	0. 413	0. 414	0. 415	0. 415	0. 416
12. 9	0. 416	0. 417	0. 418	0. 418	0. 419	0. 420	0. 420	0. 421	0. 422	0. 422
13. 0	0. 423	0. 424	0. 424	0. 425	0. 426	0. 426	0. 427	0. 428	0. 428	0. 429
13. 1	0. 429	0. 430	0. 431	0. 431	0. 432	0. 433	0. 433	0. 434	0. 435	0. 435
13. 2	0. 436	0. 437	0. 437	0. 438	0. 439	0. 439	0. 440	0. 441	0. 441	0. 442
13. 3	0. 443	0. 443	0. 444	0. 445	0. 445	0. 446	0. 447	0. 447	0. 448	0. 449
13. 4	0. 449	0. 450	0. 451	0. 451	0. 452	0. 453	0. 453	0. 454	0. 455	0. 455
13. 5	0. 456	0. 457	0. 458	0. 458	0. 459	0. 460	0. 460	0. 461	0. 462	0. 462
13. 6	0. 463	0. 464	0. 464	0. 465	0. 466	0. 466	0. 467	0. 468	0. 468	0. 469
13. 7	0. 470	0. 470	0. 471	0. 472	0. 473	0. 473	0. 474	0. 475	0. 475	0. 476
13. 8	0. 477	0. 477	0. 478	0. 479	0. 479	0. 480	0. 481	0. 482	0. 482	0. 483
13. 9	0. 484	0. 484	0. 485	0. 486	0. 486	0. 487	0. 488	0. 489	0. 489	0. 490
14. 0	0. 491	0. 491	0. 492	0. 493	0. 493	0. 494	0. 495	0. 496	0. 496	0. 497
14. 1	0. 498	0. 498	0. 499	0. 500	0. 500	0. 501	0. 502	0. 503	0. 503	0. 504
14. 2	0. 505	0. 505	0. 506	0. 507	0. 508	0. 508	0. 509	0. 510	0. 510	0. 511
14. 3	0. 512	0. 513	0. 513	0. 514	0. 515	0. 515	0. 516	0. 517	0. 518	0. 518
14. 4	0. 519	0. 520	0. 521	0. 521	0. 522	0. 523	0. 523	0. 524	0. 525	0. 526
14. 5	0. 526	0. 527	0. 528	0. 529	0. 529	0. 530	0. 531	0. 531	0. 532	0. 533
14. 6	0. 534	0. 534	0. 535	0. 536	0. 537	0. 537	0. 538	0. 539	0. 539	0. 540
14. 7	0. 541	0. 542	0. 542	0. 543	0. 544	0. 545	0. 545	0. 546	0. 547	0. 548
14. 8	0. 548	0. 549	0. 550	0. 551	0. 551	0. 552	0. 553	0. 554	0. 554	0. 555
14. 9	0. 556	0. 557	0. 557	0. 558	0. 559	0. 560	0. 560	0. 561	0. 562	0. 563
15. 0	0. 563	0. 564	0. 565	0. 566	0. 566	0. 567	0. 568	0. 569	0. 569	0. 570

Inclination Correction 200-FOOT LENGTH

FIGURE 5

Nomogram For Calculation of Correction to Measured Lengths Due to Inclination of Tape

Figure 5 permits the evaluation of the first term of the inclination correction directly without calculation. It provides the same result as the use of Table I within the limits of graphical accuracy. The second term must be evaluated separately from the graph in Figure 4, even if a full 200-foot span is used.

The nomogram is used as follows:

- (1) Select point on left scale corresponding to difference of elevation between ends of measured span.
- (2) Select point on right scale corresponding to measured inclined length.
- (3) Connect points (1) and (2) with a straight line.
Where this line crosses center scale, read correction.

NOTE: It is important that the correct corresponding scales of difference in elevation and measured length be used. That is, for elevation differences in the range of 1.0 to 5.0 feet, use length scale (A); for elevation differences in the range of 5.0 to 15.0 feet, use length scale (B).

Example 1:

$$H=3.29 \text{ feet (Scale A)}$$

$$L=70 \text{ feet (Scale A)}$$

$$\text{Correction} = -0.077 \text{ foot}$$

Example 2:

$$H=11.50 \text{ feet (Scale B)}$$

$$L=150 \text{ feet (Scale B)}$$

$$\text{Correction} = -0.441 \text{ foot}$$

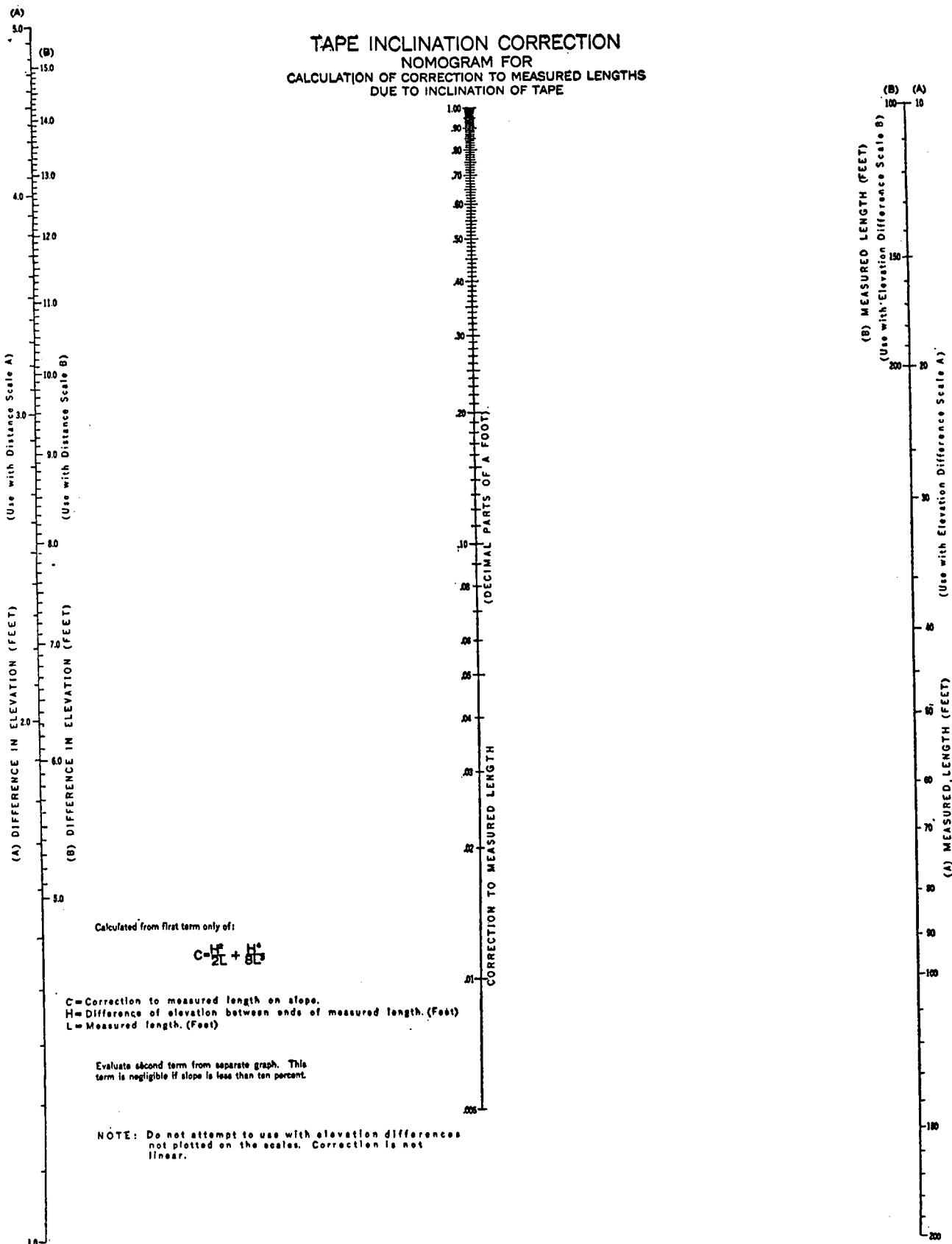


FIGURE 5.

FIGURE 6

Nomogram For Calculation of Allowable Error in Determination of H

The nomogram in Figure 6 is designed to provide information on the question as to the accuracy with which the difference in elevation (H) between the ends of a measured span which must be determined. The nomogram gives the tolerance in H which must not be exceeded if the inclination correction is to be determined with an accuracy of not less than one part in twenty thousand of the measured span.

The tolerance is evaluated from the nomogram as follows:

- (1) Select the point on the scale H (right scale of nomogram) corresponding to the value of H (difference in elevation).
- (2) Select the point on scale L (center scale of nomogram) corresponding to the value of L (length of taped span).
- (3) Draw a straight line through the above points, extending it to intersect scale T (left scale of nomogram). At the point of intersection, read the tolerance (in decimal parts of a foot) in the determination of H .

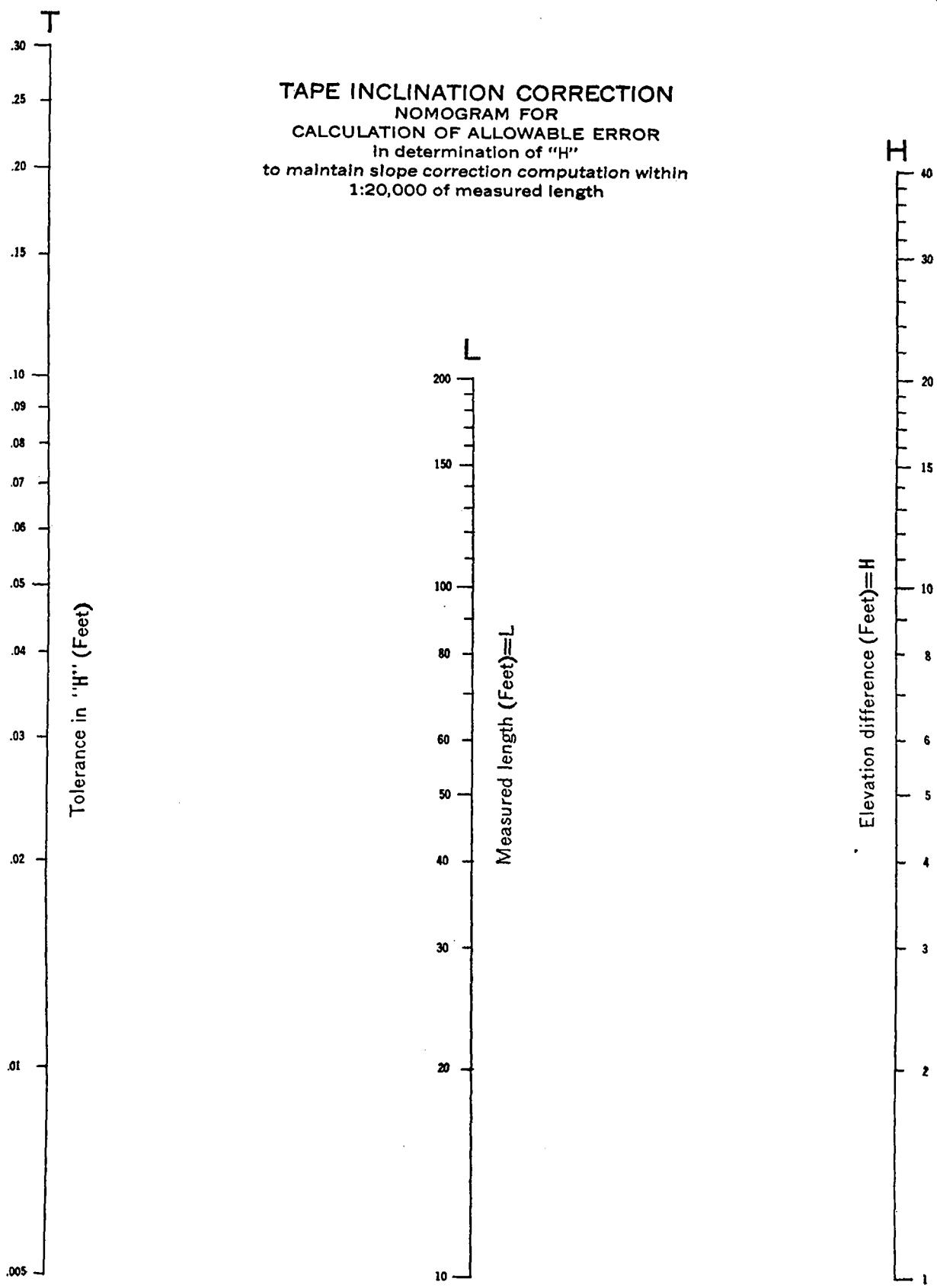


FIGURE 6.

Special Publications of the U. S. Coast and Geodetic Survey (available from Superintendent of Documents, Washington 25, D. C.) which furnish data for conversion of geographic positions to state plane coordinates and for correction of traverse measurements for scale factor:

<i>State</i>	<i>Special publication</i>	<i>State</i>	<i>Special publication</i>
Alabama	304	Nebraska	286
Arizona	257	Nevada	318
Arkansas	289	New Hampshire	317
California	253	New Jersey	316
Colorado	276	New Mexico	324
Connecticut	266	New York	323
Delaware	305	North Carolina	272
District of Columbia	(*)	North Dakota	262
Florida	255	Ohio	269
Georgia	322	Oklahoma	287
Idaho	306	Oregon	270
Illinois	303	Pennsylvania	267
Indiana	259	Rhode Island	315
Iowa	284	South Carolina	273
Kansas	285	South Dakota	263
Kentucky	290	Tennessee	268
Louisiana	291	Texas	252
Maine	256	Utah	277
Maryland	292	Vermont	314
Massachusetts	274	Virginia	293
Michigan	313	Washington	271
Minnesota	264	West Virginia	275
Mississippi	321	Wisconsin	288
Missouri	319	Wyoming	258
Montana	261	Hawaii	302

*Use Maryland or Virginia.