INDEX

of

Surveys

by

GEAUGA COUNTY

Engineering Dept.

Please Return to
Geauga County Engineer
Court House - Chardon, O
Phone Chardon 5-5951 ~~250X~~

Roads

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Ditches

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Misc. Surveys

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* County Highways = Nos. 1 to 47

Twp Highways = Nos 48 to

Road Number	Name		Section	Field Book	Sec.	F. B.	Sec.	F. B.
#1	~~Hiram Rapids~~	Transit	A,B,C,D,+E	100				
#1	" "	Levels	" "	101				
#1	" "	Transit #2	F,F,G+H	79				
#2	Parkman-Nelson		A,B,C	36				
#2	Parkman-Thompson	Levels	A,B,C	72 (48)	* slopes D	168	MN	129
#2	" "		E,F,D	129	HIJ	172		
#3 (#changed 12-53 to # 34)	Claridon-Troy (Gingerich Cor's)	Transit	[illegible]	6	Patch Rd-Nth to Burton Twp Page 268			
#3	" " (" ")	Levels	A	7	and Thru Claridon Twp		Road Rec.	
#3	" "	Transit	A,B,C,+D,E	75-76	F+G	8	H	87
#3	" "	Levels	B,C,D,+E	73-74 (157)		16 157 H&K	H	88
#4	Auburn-Chardon		A,B,+C	158	F,G,H,I,J+K 1950	78-61-165	L&M	140
#4	" "	Transit	N,O	3	DEFG	158		
#4	" "	Levels	N,O	4	P,Q,R	168 51-43		
#4	" "		P,Q R	140A 3-140	S,T,U,R	45	E,F&VILL	29
#5	~~Aquilla Road~~ ~~County Home~~		Bridge	60		Mayfield Rd. S to Twp. Line		40
#5	Chardon-Mentor	Transit	A,B	128,161	G	78a	D	
#5	" "	Levels	all	84				
#6	Old State Road		all	85+86	C (Storm Sewer '44)	167		
*SR528SH746	Midd.-Madison	℄	A,B,C,D,E+F	148	G,H	150 112 113		
			[illegible]	122				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#7	Thompson Center	Transit	A,B,C,D,+E	119-120	F	14-152	G-H	161 152
#7	" "	Levels	A,B,C,D,+E	121		116		
#8	Wilson Mills	Transit	A,B,C,D,E,+F	49 52	G,H,	98-66	I,J,K+L	3
#8	" "	Levels	A,B,C,D,E,+F	50 53	G,H	99	I,J,K+L	4
#9	Chagrin-Bainbridge	Transit	A,B,C+D	82				
#9	" "	Levels	A,B,C+D	80-81				
#10	Bell Street		56. Russ A,B	133 124	C, F	61-124A		161
#11	Solon-Auburn		A,B,C,+D	59-43-158 166	E+G-H	131	C	62
#12	~~Fullertown~~ Sperry		A,B,C,D,E+F	61-164				
#13	Chardon-Windsor		A+B	63-161 174	C+D	8	E,F,G+H	35
#13	" "		J	116				
#14	Burton-Windsor		A,B	145-42-163	G,D,E,F+G	41 & 42		
#16	~~North Woodland~~ Fairmount		A,B,C	104 173	G,D-E	105	D,E,F	61-148
#17	Kirtland-Chardon		A,B	86-136			County Line	43
#18	Parkman-Farmington		all	43-162 168		168		
#19	Swine Creek Rd.		all	150				
#20	Diagonal (Chagrin Falls N.E.) Russell		(plan on file ~~No field Book~~)			173		
#21	Burton-Chester (Butternut		A,B,C,+D	54	D,E+F	125 128	I G+H	144 128
#15 ~~#11~~	Hale Rd.		A,C+C	128				

Road Number	Name		Section	Field Book	Sec.	F.B	Sec.	F.B.
#22	Brakeman Rd.		all	90				
#23	Bass Lake		A, B	125	C, D	61	D, E, F+G	92-97
#23	" "	Levels	D, E	93				
#24	Mumford		all	22-23				
#25	Hamboden Center Rd. (Woodin)		all	91				
#33 #26	Leggett		all	135 9	C (levels 1944)	167		
#26	Morgan		all	9		167 pg 68		
#27	Chardon-Munson Twp. Line (Thwing Road)		all	97				
#28	Wells St.		all	10-162				
#29	Dines Cor's. Rd. (Pekin)		C, D	106				
#30	Hotchkiss Rd.		A, B	125	B, C+D	56		
#30	" "	Levels	B, C+D	65				
#31	Messenger Rd.		all	110-111	~~#6~~	170		
#32	Brown Rd. (MUNN)		A, B, C & D (A & B)	131-138	~~B~~ E, F & G	51		
#36	~~Walters~~ Rd. (HEMLOCK) Music Street		A, B+C	106-155	D	106		
#37	Clay St.		C, D+E	126	E, F	118	G, H+I	15
#38	Bundysburg Rd.		all	38-46				
#39	Mulberry Rd.		A-B-C-D ~~G~~ H	19 96	E-F-G	127		
#40	Philips Rd.		All C H.	167		142		

#34 = Gingerich Rd 86 & 87

Road Number	Name	
#41	Sidley Rd.	
#42	Underledge Rd	
#43	Moseley Rd.	
#44	Kile Rd.	
#45	Spencer St.	
#46	Jog St.	
#47 now 57	Cares Rd	Transit
#47	" "	Levels
Twp Roads		
#48	Stocking Rd. (Thompson)	
#49	Moseley Rd & Phelps (Thompson)	
#50	Trask	"
#51	Leroy Center Rd	"
#52	Valentine Rd.	"
#53	~~Webster Rd.~~ CLAY 57	"
#54	Dewey Rd	(Thomp. & Mont.)
#55	Sullivan Rd.	(Thomp.)
#56	Under-Ledge Rd.	"

Section	Field Book	Sec.	F.B	Sec.	F.B.
C (1943)	167				
all	152	D	167+169		
A-B-C	14	D	152		
A, B, C + D	117-2				
all	134 43				
A, B, C, D + E	20	E + F	77		
E, F + G	67				
E, F + G	68				
	152				
K	156				
A, B, C	135				
	Vacated				
all	156 135				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#57	Dickerman (Chardon-Jefferson) Rd. (PHILLIPS 1950)	(Thompson)		142 135				
#58	Sidley Rd.	Thompson	A	167				
#59	Sidley Rd.	"		14				
#60	Montville-Thompson Twp. line (BURROWS)		A, B, D	135	B (levels 1944)	167		
#61	Leggett Rd.	(Mont.)		135				
#62	~~Twp. line~~ (KILE) Rd.	(Hamb & Mont.)		17				
#63	Hart Rd.	Mont.		135-142				
#64	Hautala Rd. (formerly Chain)	"		136				
#65	Whitney Rd.	"	A, B+C	33				
#66	~~Brown~~ (SUN) Rd.	(Montville)	271	163 91				
#67	Sumner Rd.	Hamb.		89				
#68	~~Procter~~ (Williams) Rd.	"		89				
#69	Bascome Rd.	"		89				
#70	Pearl Rd.	(Hamb. & Chard)		91				
#71	Brown-~~Radcliff~~ Rd.	(Hamb)						
#72	Cutts Rd.	"		91		93		
#73	Grant Rd.	Hamb & Chard.						
#74	Lost Rd.	(Hamb)	See Road Records " Hambden Twp file					
#75	Sisson Rd.	"	Culv't 1950	167				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#76	Robinson Rd.	Chardon	(plan on file)		A	169	B	174
#77	Clark Rd.	Chardon	A, B	153				
#77	~~Hinchell Rd.~~							
#78	Hosford Rd.	"		153				
#79	Griswold Rd.	"		153				
#80	Little Mt. Rd.	"						
#81	Hermitage Rd.	"		59				
#82	~~Searsbrook Rd.~~ Colburn RD 1955	"		Plat on ~~#36~~ File	16 F.B.			
#83	Wisner Rd.	"						
#84	~~River~~ WISNER Rd.	"		86		136(p32)	C	
#85	Wilder Rd. (Chardon Twp.)	"	½ N half Transcript	55	(plat on file)			
#86	Canfield Rd.	"						
#87	Welk Rd.	"	136					
#88	Mitchells Mill Rd.	"	plan on file	168	(No field Book)		1950 A	136
#89	Heath Rd.	Chester	A, B.	164				
#90	Sperry Rd.	"		29				
#91	~~East Mill Dr. Factory Rd.~~ Old Mill Rd (1950)	"		19				
#92	~~Cove Rd.~~	"		~~67~~ 167	A-B-C — 166			
#93	Countyline Rd.	Russell & Chester	C	155	E	55	G, H	45
	" " " Reloc. Jadds Gulch			155				

#96 Walnut Ridge Rd Chester

Road Number	Name	
#94	~~Piety~~ ~~Ferry~~ Brook Lane Rd.	Chester
#95	~~Piety~~ Rd. FERRY 5/17/54	"
1948 → #39 ~~#96~~	Mulberry Rd.	"
#97	~~Sherman Center~~ Rd.	Chester & Monson
#98	Cedar Rd.	Chester
#99	Wearsch	Monson
#100	Woodiebrook	"
#101	Basswood	"
#102	Lakeview	"
#103	Bean	"
1950 → #98 Cedar Rd ~~#104~~	~~Monson Newbury Twp. Line~~ Heath Ranch Dr	~~Chester~~
#104 ← #105	Harvard Rd. & Sherman	Chester & Monson
#106	{Rock Haven Rd.}	Newbury & Monson
#107	E. Lye Rd.	Monson
#108	Fowlers Mill Rd.	"
#109	Hall Rd.	Claridon
#110	Stillwell Rd.	Clardn & Htsbg
#111	Ensign Rd	Claridon
#112	Lt. Dorkee Rd.	Clardn & Burtn

#104 RANCH DR CHESTER

Section	Field Book	Sec.	F.B.	Sec.	F.B.
	45				
	15				
A, B, C & D	19	E, F & G	127 135		
A, B, C	139	D & E	29 & 59		
B A →	43-64	E & F	175		
	3				
	3				
	94				
	94				
All	3				
A	43	B	64		
	& B 164				
C & D	95		60		
B, C	17				
	144				
A & A South	44	D	96		
	{175				
A & B	{168				
	117				
A	166	B	117		
	34-35				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B
#113	Taylor Rd (Taylor wells)	Claridon		17				
#114	Forest Rd.	Claridon & Burton						
#115	Huntley Rd	Htsbg	A, B, C.	146	D	116		
#116	~~Hell~~ Pioneer Rd.	"	A, B	114	C, D	114-115		
#117	E. Durkee Rd.	Htsbg & Mdfld		163-39			E (cul-t levels '44)	167
#118	Princeton Rd.	Htsbg	A, B	47	C, D + E	17		
#119	Clay St.	"	A, ~~B~~	146	B	113		
#120	Hunt Rd.	"	A, B	116				
#121	~~Mansfield~~ Hayes Rd.	"						
#122	Peters Rd.	Mdfld	A, B	141				
#123	Nauvoo Rd.	"	A	134				
#124	Georgia Rd.	Burton & Mdfld	A, B	79	B, C	134		
#125	Bridge Rd.	Mdfld		151				
#126	~~Middlefield-Parkman Twp line~~ Shed		A - B	130				
#~~127~~ 126	Shedd Rd.	Mdfld & Prkmn	B	148				
#128	Station Rd.	" & Burton	D	148				
#129	Hayes Rd.	"						
#130	Newcomb Rd.	" & Parkmn	D	141				
#131	Fisher Rd.	Burton	A, B	130, 23				
			A, B	128				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#132	Osmond Rd.	Burton						
#132	Hoeret Rd	" EMIL						
	CHIPMUNK LANE 60'			Vol D Page 32				
#133	~~Osmond Rd~~	"						
#134	Facey Rd.	Burton & Newby						
#135	~~Bigelow~~ ~~Hill~~ Rd.	Burton						
#136	~~BURTON Hts. Blvd.~~ ~~Memorial Rd.~~	"	West end Vacated 1949					
#137	" "	"						
#138	Hubbard Rd.	"	A, B	77				
#139	Pond Rd.	Burton & Newby						
#140	White Rd.	Burton	C	168				
#141	Rider Rd.	"		174				
#142	West St.	"						
#143	Peckham Rd.	"					B -	106
#144	Pekin Rd.	Russell & Newbury	E, F.	61	G	125	A -	137
#145	Snow Rd.	"						
#146	Music St.	"	A, B, C	61	C	125	A (West of Munn Rd)	Levels 165
#147	Munn Rd.	"		51				
#148	Snow Rd.	Auburn & Troy		55				
#149	Stone Rd.	"						

Fld. Bk #59

#176=Woodland Ave(Chag. Falls Park) Vol. 1 pg. 60 Rec. of Plats

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#150	Westchester Trail	Chester						
#151	Hillcrest Lane	"						
#152	Stillwater Dr.	"						
#153	Fullertown (South of Kinsman)	Newbury	Dedicated 1947	167				
#154	Larkspur	Russell						
#155	Hemlock ~~Point~~ Rd	Russell Transit		107				
#155	" ~~=~~ "	Levels		108				
#156	Northwood	Russell	Dedicated 1947	105				
#157	Caves Rd.	Russell & Chester	A,B,C	43-137	C,D.	139	EFG	67 & 68
#158	Watt Rd.	Russell		109		170		
#159 #160 #169 *	South St. (Bainbridge)							
#170	Cedar St.	"		147				
#171	Pine St.	"		145				
#172	SHORT ~~Co. Line~~ Rd. (Thompson Twp)							
#173	Murphy Rd.	Montville		186				
#174	Oak St.	Bainbge		145				
#175	Arch St. → Climax St	"		145				
#177	~~Holbrook~~ Rd							
178	~~Moon Rd.~~	"	B	147				
#179	Fields Rd.	"		147				
* 159	Cedar Acres	~~Chester~~ "						
* 160	Shady Lane							

161-168 incl
See Sheet 17

* #161 Mardon Rd #162 Silvercreek Dr.

Road Number	Name		Section	Field Book	Sec.	F.B	Sec.	F.B.
#180	Jackson Rd.	Bainbridge						
#180	Root Rd.							
#181	Giles Rd.	"						
#182	Geauga Lake Rd.	"						
#183	Geauga Lake Rd.	"	A,B,C+D	D; C-D-E 43-62-147	D	131		
#184	Brewster Rd.	"						
#185	Pettibone Rd.	"		37				
#186	Taylor-May Rd.	Bainbridge & Auburn	A,B,C+D	83	E,F+G	SEE 83 143?		
#187	Stafford Rd.	" & "	B,C,D,E	138-51	F	51		
#188	Franklin St.	"	Cpt.	166	A	59		
#189	Harvey Rd.	"	A Pt	82				
#190	Savage Rd.	"						
#191	Haskins Rd	"	all	149				
#192	Snyder Rd	"	B,C	62	S.R.VIL. D+E	133 33		
#193	~~Mills~~ Franks Stafford Rd.	(Auburn Twp)	A & B	138				
#194	Reed Rd.	Auburn & Troy		66 145				
#195	Bartholomew Rd.	Auburn	A,B+C D	143?		REF. 137		
#196	Quinn Rd.	"	A	138 145				
#197	Thorpe Rd.	"	A,B	143?				

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#198	Wing Rd.	Auburn						
#199	Valley Rd.	"	A, B	55				
#200	Brown Rd. (Co. line Hambden Twp)	RADCLIFFE						
#201	Fox Rd.	Troy						
#202	Girdle Rd.	Chardon						
#203	Shaw Mantua Rd.	(Auburn & Troy						
#204	Winagle							
#205	Springbrook Patch	"						
#206	Patch	Troy & Parkman						
#207	Center Rd. (Troy-Parkman)	NASH	C	130	A	160		
#208	Tilden Rd (Troy)			160				
#209	Hoover Rd.	"		160				
#210	Agler Rd.	Troy & Parkmn	23					
#211	Grove Rd.	" "	A, B, C & D	23	B	160		
#212	Farley Rd.	"						
#213	Reeves Rd	"						
#214	Soltis Rd.	"						
#215	Bradford Rd.	"						
#216	Payne Rd.	"						

#205 1952

#206 ENGLISH DRIVE 1952 (Bain)

223 — Maple Drive — Chester
224 — Woodside Drive — "
225 — Whiting Drive — Chester

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
#217	Rutland Rd.	Parkman						
#218	Hobart Rd.	"	B	162				
#219	Owen Rd.	"		162				
#220	Hosmer Rd.	"						
#226	Udall Rd — Troy							
#227	Seminary Lane	Chester		69				
#228	Riddle Rd.	Russell		155				
#229	Opalocka Dr.	Chester		140A				
#230	Gottrell Dr.	"						
#231	Ward Dr.	"		137				
#232	Lake St.	Bainbdge						
#233	Skylyne Lane	Russell						
234	Chagrin Mills Road	Russell		107				Recorder's Plats Vol. 4 pgs 20821
	CRACKEL Rd							
#269	~~Benjamin Rd.~~ (Bnbge & Aub'n)							
#270	Harner Rd.	Auburn						
#302	Colony Lane	Burton		77				
#303	Reynolds Rd.	Parkman						
#311	Bundysburg-Windsor Mills Rd.		B, C & D	141	D, E & F	134-141		
221	Hillcrest Rd.	Munson		95				
222	Sylvanhurst	"		95				

#235 et seq see pgs 14, 16

Over

→139, 139, 139 → Dedicated 1946

Over

Road Number	Name		Section	Field Book	Sec.	F.B.	Sec.	F.B.
~~#402~~ #82	Colburn Rd.	Chardon	(plat on file No Field Book)					
~~#602~~ #96	~~Gem Rd~~ Hilder Rd.	(Chester Twp.) ~~& Kirtland~~	~~29~~					
235	BLACKFORD DR.	RUS	FILE					
236	BIRCHMONT DR.	RUS	FILE					
237	CLARION DR.	RUS	FILE					
238	ELM RD.	RUS	FILE					
239	FAIRVIEW RD.	RUS	FILE					
240	FERNWOOD RD.	RUS	FILE					
241	HAZELWOOD DR.	RUS	FILE					
242	LAUREL RD.	RUS	FILE					
243	MAPLERIDGE RD.	RUS	FILE					
244	SYLVAN RD.	RUS	FILE					
245	BROOKSIDE RD.	MUN ✓	94					
246	CHESTNUTDALE RD.	MUN ✓	94					
247	EDGEWOOD RD.	MUN ✓	94					
248	FERNWAY RD.	MUN	94					

CONT PG 16

State Hwy. No.	Name	Section	Field Book	Sec.	F.B.	Sec.	F.B.
#15	Cleveland-Mentville Rd	(Mayfield)	57 66				
#33	Cleveland-Burton Rd.	(Kinsman)					
#34	Cleveland-Chardon Rd.	(Chardon Rd)					
#35	Chagrin Falls-Greenville Rd.	(Main Market)					
#153	Painesville-Warren Rd.	(Old Plank)					
S.R.#9 #324	Painesville-Revenna Rd.	Chardon South 70 C.H.-23	92				
#325	Burton-Warren Rd.						
#326	Revenna-Parkman Rd.						
#327	Chardon-Madison Rd.						
#447	Burton-Bloomfield Rd						
#460	Cleveland-Kent Rd						
#475	Hambden-Andover Rd.						
S.R.#700 #514	Atwater-Troy Rd.	C, D	102-103	D, E	6-7		
#585	Nelson Ledge Rd.						
#651	Kenter-on-the-Lake (Chillicothe) Aurora Rd.	(Chillicothe)	Russell, T 31-L 32-T 5 Bainbridge, 24-25-26-27-28-30-171			Chester, T 9-10-11	
#739	Rock Creek Western Rd.	(Tillotson's Cor's E to Co. Line)	12				
#746	Middlefield-Madison Rd.	Midd. Twp.	T 122-L 123	Huntsburg	112-113-126	Mont.	18
#953	Middlefield-Concord Rd.	(Old State Rd)	(Midd. 39-40	X Claridon, 1-11	X Hambden	87-88-145	

ROAD NO.	NAME	TWP.	SECTION	F.BOOK
249		MUN		94
250	MAPLEWOOD RD.	MUN		94
251	ORCHARD RD.	MUN		94
252	OVERLOOK RD.	MUN		94
253	PARKSIDE RD.	MUN		94
254	PARKWAY RD.	MUN		94
255	ROCKSIDE RD.	MUN		94
256	SPRINGWAY RD.	MUN		94
257	SYCAMORE RD.	MUN		94
258	WILBERT RD.	MUN		94
259	HERRICK DR	CHEST		
260	PARKVIEW "	"		
261	HOVEY "	"		
262	VALLEY VIEW "	"		
263	BUCKEYE "	"		
264	GEM	"		79
265				
266				
267				

161	Mordon	Ross
162	Silvercreek Dr.	"
163	Sharp Lane	Chest
164	Lakewood Dr.	"
165	Bardwell "	"
166	Hillview	New
167	Crestwood	"
168	Scotland Dr.	Bain

Alphabetical Listing of Ditch Surveys

A

Field Book No.	Ditch Name
13	Auburn Ditch STORM & SEWER
158	Almy Ditch South Auburn

B

Field Book No.	Ditch Name
142 #306	Blakeslee Ditch (Thompson Levy RD)
21	Bass Lake Ditch
154	Black Brook Ditch SEC "F"
157	Bridge Creek at CH. #4 Auburn SEC "B"
124	Bell St TILED DITCH by Button

C

Field Book No.	Ditch Name
136	Chagrin River Cleanout (Mitchells Mill)
34	Claridon Cuyahoga Ditch
131	Clemens (off Brown Rd)
60	Claridon Cuyahoga Ditch '43
136	Chagrin River (W. Chardon Township)
167	" "
140A	" " N of Fullertown

D

Field Book No.	Ditch Name
60	Ditch Survey Thompson
134	Ditch fr. C.H. #45 S. To Mayfield Rd.
14	Ditch in N.E. Thompson (Germany Cors)
21	Ditch Bass Lake outlet

E

Field Book No.

F

Field Book No.

G

Field Book No.	
14	Germany Cor's. Ditch
161 304 305	Greens Cor's. E. Ditch for {Slewinski / Wm George}
	GROVE TO PARKMAN ?

H

Field Book No.	
	158, HERTEL CULV AUBURN CH, 4

I

Field Book No.

J

Field Book No.

K Field Book No.	
113	KLEIN DITCH (1943) (± ½ E of Huntsg Ctr)

L. Field Book No.	
30	Lowe Ditch (Bainbridge)

M

Field Book No.	
33 18	Montville Ditch (Est. + Regrading)
136	Mitchells Mill (River cleanout)

N

Field Book No.	
159	Nauvoo Ditch + Lateral

O

Field Book No.	

P

Field Book No.	
159	Pease Creek Ditch
159 304-305	Phelps Creek & Laterals
160	Parkman-Troy Ditch

Q

Field Book No

R

Field Book No

142 Riley Ditch (Moseley Rd. Thompson)

12 Tare Ck levels 1950

S

Field Book No	
157	Smiths Crossing's Ditch
138	Stafford Rd. Ditch
36	Soltis Rd. Ditch
134	Spencer St. Ditch (Claridon)
140A	Silver Creek (Russell Twp)

T

Field Book No.	
109-60 304-305	Thompson Twp. Ditch
160	Troy-Parkman Ditch
14	Thompson (East) Ditch

U

Field Book No.

V

Field Book No.

138 Voytko Ditch (Auburn) Grades pgs 16-17

166 " " levels (1942)

W
X
Y-Z

Alphabetical Index to Bridges & Culverts

A

Field Book No.	
43	Auburn - Solon Rd Bridge
140	C.H. #4 (North of Thawing)

B

Field Book No.	
153	Bass Lake outlet Bridge
43	Bainbridge-Solon Rd. Bridge
51	Brown Rd. Bridge (32-E-10) Auburn
60-161	Bell St. Culvts.
60	Butternut Creek Bdge (County Home Road 5-C
see file Ch. Hts Subd.	Birchmont Drive (in chagrin Hts)
150	BOORN CULVERT
133	BELL ST " McFARLAND CREEK BRIDGE " "
124	" " by Wm George 179±25
43	Burg Rd Bridge

C

Field Book No.	
153	Chardon-Windsor Rd. Bridge
43	Chagrin River Bridge (Wilson Mill)
43	" " " (Pettibone Rd)
59	" " " (E. + Wd Ctr. Rd Monson)
153 8	Cuyahoga river Bridge on S. Hambden
153	Chagrin river Bridge on C.H. #4
~~120~~ 59	" " " at (Hogsback)
43	" " " on Solon-Bainbridge Rd.
~~35~~ 130	Culverts on Fram's Cor's. N. Rd.
43	Cedar Rd. Culv't. E of Co. Line
153	Clark Rd. Culv't's.
127	CHAGRIN RIVER (MULBERRY RD)
162	Chardon Vill. Streets
60	County Home Road (Buttermut Creek Bridge
136	
167	Chag. River Reloc. '47
see File →	Chagrin Hts Subd. Rds
86	CHAGRIN RIVER AT C.H. 17
79	CUYAHOGA Bridge at C.H. #1
54	CHAGRIN Bridge on C.H. #21

D

Field Book No.	
C cont'd	
106	CHAGRIN RIVER ON PEKIN
175	CHAGRIN RIVER Bridge on Fairmount

E

Field Book No.

F

Field Book No.
130
~~35~~

Frams Cors N. Rd. Colverts

G

Field Book No.	
43	Grand River Bridge (Perkman)
161	Green's Crossing E. Colvert
23	GEORGIA RD Bridge

H.

Field Book No	
59	Hogsback Bridge (Munson)
59	Hermitage Rd. Colv't. (chardon)
158	HERTEL CULV. #4 C.H. (AUBURN)

I

Field Book No

J

Field Book No.

K

Field Book No.	
86-136	Kirtland-Chardon Rd. Bridge

L.

Field Book No.	

M.

Field Book No.	
	Sherman Rd.
59	Monson ~~E & W Ctr. Rd.~~ Bridge
59	McFarland Creek Bridge
(P. where) 58	Mitchells Mill Bridge
43	Moseley Rd. Culverts
125	Music St over Punderson Lake Outlet
127	Mulberry Rd. Bdge over Chag. River
85	MAPLE ROCK C. H 75'

N.

Field Book No.	
36	NELSON Rd CULVERT
43	" " Bridge

O

Field Book No.	
148	Old State Rd. Bridge

P

Field Book No.	
43	Pettibone Rd. Bridge
45	Piety Hill Rd. Culvert
125	Punderson Lake Outlet & Music St.

Q-R

Field Book No.	

S

Field Book No.	
43	Solon-Auburn Rd. Bridge
43	Swine Creek Bridge
153	Sperry Rd. Bridge
153	South Hambden Rd. Bridge
60	South St. Culverts (Bainbridge)

T-U

Field Book No.	
83 p60	Taylor-May Rd (Sec. B) Auburn
	Tare creek levels
12	#14 south

V-W

Field Book No.	
59	Worthington Cor's N. Culvt. (Chardon)
43	Wilson Mill Rd Bridge

X-Y-Z

.. Field Book No.

Misc. Surveys
Alphabetical Listing.

A

Field Book No.	Survey
43	Agriculture Society (Bort. Vill.)
60	Alderman pond (43)
145	Arch St. Bain.
128	ALDERMAN (NYE'S) POND LEVELS.
77	
20	BELL TEL CO UNDER GROUND LINES ON SUGAR ST.

B – CONTINUED PAGE 52

Field Book No.	Survey
94	Bass Lake Allot.
35	Burton Board of Edu. (Bort. Vill.)
43	Bussman Surv. (Claridon Twp.)
132	Button Ave. Relocation (Midd. Vill)
25	Bainbridge Twp Hall Surv.
25	" " Garage"
25	" " Cemetery Add.
153	Board of Edu. E. Claridon
69	Bench Mark at Chesterland
25.	Bainb. Sch. Bd to Bainb. Trus. 1942
97	Bass Lake road ditch past Warner property
161	Drainage Hq S of Culvt Sta. 44+27 Bell St.
166	Burton Trs. (Cemetery E of Steeles Xing)
133	Bell St. So. Russell
95	Beaver Creek Drives
154	Black brook Flood ch. on Rapids

C 155 Court House

Field Book No.	Survey
147	Cedar St. (Bainbridge)
13	Chester side walk grades
60 NEW OLD	County Garage Surv. Nicholas St. Page 1-2 " 75-76
134	County Home Water supply Levels
134	" " Locations ect. W.P.A
8	Claridon Ctr. Park survey
29	Claridon Macadam (Vill. Sec.)
139	Chester Twp Hall Surv.
162	Chardon Ave (Chardon Vill.)
69	Seminary Lane Chester School Lane
140	Chardon-Auburn (Downings Cor. McIntosh trial)
155	County Prop. Surv. Chardon Vill
60	Cuyahoga River (St 322 to Ald. pond)
See file → No fd. bk.	Chardon Twp. Trustees (Prot. Estant Sch. property)
24-28 888 171	Chillicothe Road, Bainbridge
162	Chardon Vill. Streets.
87	Cemetery (Sisson) Hambden
Pg. 369 I.S. 55 (Rec. office)	Chester Twp Park CONT Pg 50

D, E

Field Book No.	Survey
60	Dran, J. Surv. (Huntsburg Twp.)
140 pg. 47	Downing's Cor's (McIntosh trial)
132	Elm St. Sewer (Midd. Vill.)
153	E. Claridon Bd. of Edu. (Sewer)
153	" " " " " (School lot
162	E. King St. (Chardon Vill.)
153	E. Claridon Cemetery

F, G

Field Book No.	Survey
43 & 76	Fair Grounds Surv. (Harmon + Crosley, Burton, Pels)
43 & 76	" " 1942
76	Topo for new grand-standat Fair Grounds
167	Fullertown Rd. Ext.
169	Fair Grds. (Proposed new race track) ETAL 1950
168	Fair Grds. Proposed Sair Sewer 1950 (From 1950 Grand Stand SW. to Village Sewer
43 & 76	Geauga Co. Agri. Soc. (Burt Vill.)
106	Gore Hill (Music St.)
93	Geauga-Lake Co. Ref. on CH. #17
174	Goodwin Ave (Burt. Vill)
155	Geauga Co. Lot Center St Chardon Vill.
174	FAIRGROUNDS 1951 SPOT LOCATIONS

Detail Index in File → FAIRGROUNDS SURVEYS & pg 51

43	GREGORY SURVEY

H, I

Field Book No.	Survey
132	High St. imp. (Midd. Vill.)
145	Hambden Ctr. Approach
155	Hennesey Lot Surv. (Chardon Vill
145	Hambden Ctr. Park Surv.
162	Honington Ave. (Chardon Vill.)
60	Hoeret Dam (Burton Twp
87	Hambden (Sisson) Cemetery
8	Huntsburg Trust. Townhall prop.
173	HUSTED FOREST Reserve (Auburn Twp)
95	Hillcrest Dr
140A	HAMBDEN TWP NOTES
134	Infermery Notes for W.P.A.
168	HAMBDEN CTR CEMETERY

J, K

Field Book No.	Survey
17	Kellogg School Surv. (Claridon Twp)
117	Kile Rd Mill Location
153	King St Cem (Chardon Twp)

L, M

Field Book No.	Survey
43	Lake-Geauga Co. Line Ref. on C.H. #11
69	Latitude & longitude Chardon H_2O tower
302	Litzle (Bainbridge-Russell)?
132	Middlefield St. imp. (High St.)
132	" Sewer Elm St.
162	Maple Ave (Chardon Vill.)
25	Mont. Trustees 1942
25	" " (Cem.) 1946
139	Maple Dr. (Chester)
44	Munson School
97	" " (Bass Lake Rd '54)
18	Montville School '55

N, O

Field Book No.	Survey.
105	Northwood Rd - Russell
167	Newbury Town Hall
145	Old State Rd. (Hamboden Chr. Appr.)
145	Oak St. (so called)

P, Q

Field Book No.	Survey
43	Presley, Cha's (Chardon Twp.)
~~17~~ 14 ?	Pope res. Sanitary sewer
100	Pope Farm Surv.
134	Pope-Dorcas Notes for W.P.A.
19	A. Pots - Mulberry Road
162	Pages on Wells St.
36	Parkman Dump 1950
36	Parkman Alley

R

Field Book No.	Survey
86	WISNER River Rd. retaining wall (Chardon Twp
153	Russell School Surv.
169	Race Track Burton Proposed 1929
140A	Russell Farm Elvs.
104	Briar Hill Russell Riverview Cem. Add.

S

Field Book No.	Survey
43	Shattuck, Geo. (Hambden Twp.)
45	Stafford Hill (Chardon Twp.)
55	Standard Oil Co. Surv. (Burton Sta)
132	Sewer (Midd. Vill.)
131-147	Snake Hill (Bainbridge)
136	Scarsbrook Hill (Chardon Twp.)
140	Shatford Surv. (Auburn Ctr.)
132	State St. (Midd. Vill.)
69	Seminary Lane (Chester)
157	S. Newbury Cemetery
143	Sunset Drive (Auburn Twp.)
87	Sisson Cemetery (Hambden)
174	South Cheshire St. (1920)
95	Slyman Dr. (Munson)

T, U

Field Book No.	Survey
35	Talcott, Surv. (Bart. Vill.)
132	Thompson Ave. Relocation (Middl. Vill.)
154	Troy Twp. Cemetery
160	Troy Twp. Community Lot
160	TROY TOWN HALL LOT 1951
69	U.S.G. B.M. at Chesterland
30	" " " BAINBRIDGE

V, W

Field Book No.	Survey
139	Whiting Drive (Chester)
139	Woodside Dr. (Chester)
174	WEST STREET BURTON VILL TWP
86	WISNER Rd retaining wall
12	Water St. Sewer Ext. (Chardon)
35	Warren, Geo. (Burton Vill.)
60	Wood Rd. (Prop.) (Bainbridge)
161	Williams, (Ref to pipe in W Line) (Pease Creek Hambdn)
43	WELLS LEVELS (PULLS HOSP)
153	WHISTON CEM. (Chardon Twp)

X, Y, Z

Field Book No. Survey

C. BROUGHT FORWARD FROM PAGE 43 LEFT.

F.B.#	SURVEY
145	CLIMAX STREET (NOT DED)
173	CHAGRIN RIVER
177 / 136	#16 of #306 Colony Lane - Burton Twp
167	Chagrin River Relocate (Ch Twp)
155	COURT HOUSE.
134A	County Home Topo
124	COATES WELL
FILE	Ch. Hts Sub Rds

Geauga County Fairgrounds (SEE Pg 44)

F.B # 43

Grandstand location pg. 24

" " " 25 (1949) cont. from F.B. 76

Drainage - Old track & Sthly of Grndstd

Topo - S & E of Grndstd

Pg 28-34 (1952)

174 Hot Rod Track

43 Burton Well Lot Corners '53

B- CONT.

Fd Bk	
140A	Battles' Sub.
140A	Blackford (Joe) Levels
10	Buchner Survey (Claridon)
43	Burton 1Ac well Lot

IMPROVED TABLES
AND
INFORMATION

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1½ to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

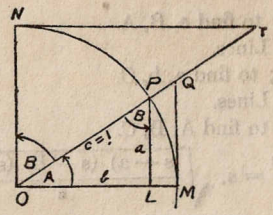


TABLE II

TRIGONOMETRIC FORMULÆ.

$\angle A = \angle MOP \qquad \angle B = \angle PON = \angle OPL$

$R = OB = c = 1$

$$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$$

$$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$$

$$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$$

$$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$$

$$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$$

$$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$$

$$\text{vers } A = \frac{LM}{OP} = LM = \text{covers } B \#$$

$$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers } B$$

$$\text{exsec } A = PQ = \text{coexsec } B$$

$$\text{coexsec } A = PT = \text{exsec } B$$

$$\sin \tfrac{1}{2} A = \sqrt{\frac{1 - \cos A}{2}} \qquad \cos \tfrac{1}{2} A = \sqrt{\frac{1 + \cos A}{2}}$$

$$\sin 2A = 2 \sin A \cos A \qquad \cos 2A = \cos^2 A - \sin^2 A$$

$$\text{Law of Lines} \quad \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C}$$

$$\text{Law of Cosines} \quad c^2 = a^2 + b^2 - 2ab \cos C$$

$$\text{Law of Tangents} \quad \frac{a+b}{a-b} = \frac{\tan \tfrac{1}{2}(A+B)}{\tan \tfrac{1}{2}(A-B)}$$

Table II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find **c**, B, A.

Use Law of Lines.

Given A, B, c; to find **a**, b, C.

Use Law of Lines.

Given a, b, c; to find A, B, C.

Let $\frac{a+b+c}{2} = s$, $\sqrt{\frac{(s-a)\ (s-b)\ (s-c)}{s}} = r$

$$\cos \tfrac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \tfrac{1}{2} A = \frac{r}{s-a}$$

$$\tan \tfrac{1}{2} B = \frac{r}{s-b}$$

$$\tan \tfrac{1}{2} C = \frac{r}{s-c}$$

Area of a triangle:

Area $= \tfrac{1}{2}$ ab Sin C

Area $= \sqrt{s\,(s-a)\,(s-b)\,(s-c)}$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6}\,(B+b+4M)$$

h = altitude; b, B = bases; M = midsection

Table III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11	
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	1
	0	1	2	3	4	5	6	7	8	9	10	11	

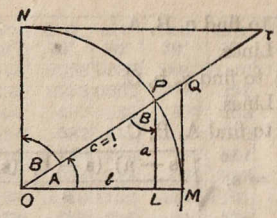


Table II
TRIGONOMETRIC FORMULÆ.

$\angle A = \angle MOP \qquad \angle B = \angle PON = \angle OPL$

$R = OB = c = 1$

$$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$$

$$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$$

$$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$$

$$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$$

$$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$$

$$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$$

$$\text{vers } A = \frac{LM}{OP} = LM = \text{covers B \#}$$

$$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers B}$$

exsec A = PQ = coexsec B

coexsec A = PT = exsec B

$$\sin \tfrac{1}{2} A = \sqrt{\frac{1 - \text{Cos A}}{2}} \qquad \cos \tfrac{1}{2} A = \sqrt{\frac{1+\text{Cos A}}{2}}$$

$\sin 2A = 2 \sin A \cos A \qquad \cos 2A = \cos^2 A - \sin^2 A$

Law of Lines $\dfrac{\sin A}{a} = \dfrac{\sin B}{B} = \dfrac{\sin C}{C}$

Law of Cosines $c^2 = a^2 + b^2 - 2\,ab \cos C$

Law of Tangents $\dfrac{a+b}{a-b} = \dfrac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)}$

Table II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find c, B, A.

Use Law of Lines.

Given A, B, c; to find a, b, C.

Use Law of Lines.

Given a, b, c; to find A, B, C.

$$\text{Let } \frac{a+b+c}{2} = s, \sqrt{\frac{(s-a)\ (s-b)\ (s-c)}{s}} = r$$

$$\cos \tfrac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \tfrac{1}{2} A = \frac{r}{s-a}$$

$$\tan \tfrac{1}{2} B = \frac{r}{s-b}$$

$$\tan \tfrac{1}{2} C = \frac{r}{s-c}$$

Area of a triangle:

$$\text{Area} = \tfrac{1}{2} ab \sin C$$

$$\text{Area} = \sqrt{s\,(s-a)\,(s-b)\,(s-c)}$$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6}(B+b+4M)$$

h = altitude; b, B = bases; M = midsection

Table III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11	
1	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	1
	0	1	2	3	4	5	6	7	8	9	10	11	

Table VI
SINES, COSINES, TANGENTS, COTANGENTS

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	89
1	175	0375	0204	0204	0233	0233	0262	262	291	291	320	320	88
2	349	349	378	378	407	407	436	437	465	466	494	495	87
3	523	524	552	553	581	582	610	612	640	641	669	706	86
4	698	699	727	729	756	758	785	787	814	816	843	864	85
5	872	875	901	904	929	934	958	963	987	992	1016	1022	84
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	190	198	83
7	219	228	248	257	279	287	305	317	334	346	363	376	82
8	392	405	421	435	449	465	478	495	507	524	536	554	81
9	564	584	593	614	622	644	650	673	679	703	708	733	80
10	736	763	765	793	794	823	822	853	851	883	880	914	79
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2095	78
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	278	77
13	250	309	278	339	306	370	334	401	363	432	391	462	76
14	419	493	447	524	476	555	504	586	532	617	560	648	75
15	588	679	616	711	644	742	672	773	700	805	728	836	74
16	756	867	784	899	812	931	840	962	868	994	896	3026	73
17	924	3057	952	3089	939	3121	3007	3153	3035	3185	3062	217	72
18	3090	249	3118	281	3145	314	173	346	201	378	228	411	71
19	256	443	283	476	311	508	338	541	365	574	393	607	70
20	420	640	448	673	475	706	502	739	529	772	557	805	69
21	584	839	611	872	638	906	665	939	692	973	719	4006	68
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	210	67
23	907	245	934	279	961	314	987	348	4014	383	4041	417	66
24	4067	452	4094	487	4120	522	4147	557	173	592	200	628	65
25	226	663	253	699	279	734	305	770	331	806	358	841	64
26	384	877	410	913	436	950	4462	986	488	5022	514	5059	63
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	62
28	695	317	720	354	746	392	772	430	797	467	823	505	61
29	848	543	874	581	899	619	924	658	950	696	975	735	60
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	59
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	58
32	299	249	324	289	348	330	5373	371	398	412	422	453	57
33	446	494	471	536	495	577	519	619	544	661	568	703	56
34	592	745	616	787	640	830	664	873	688	916	712	959	55
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	54
36	878	265	901	310	925	355	948	400	972	445	995	490	53
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	52
38	157	813	180	860	202	907	225	954	248	8002	271	8050	51
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	50
40	428	391	450	441	472	491	494	541	517	591	539	642	49
41	561	693	583	744	604	796	626	847	648	899	670	952	48
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	47
43	820	325	841	380	862	435	884	490	905	545	926	601	46
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	45
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	44
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	20 cot	10′ cos	10′ cot	deg.

TABLE VI (continued)

SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
										1.2203			
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	.2647	7753	1.2276	39
51	771	2349	790	.2423	808	.2497	826	.2572	844	.3111	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3597	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.4106	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4641	175	.4193	35
55	192	4281	208	.4370	225	.4460	241	.4550	258	.5204	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5798	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.6426	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.7090	557	.6534	31
59	572	.6643	587	.6753	601	.6864	61	.6977	631		646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	9995	31.242	9996	34.368	997	38.189	997	42.964	9998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	30′ cot	10′ cos	10′ cot	deg.

TABLE VI

SINES, COSINES, TANGENTS, COTANGENTS

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	89
1	175	0375	0204	0204	0233	0233	0262	262	291	291	320	320	88
2	349	349	378	378	407	407	436	437	465	466	494	495	87
3	523	524	552	553	581	582	610	612	640	641	669	706	86
4	698	699	727	729	756	758	785	787	814	816	843	864	85
5	872	875	901	904	929	934	958	963	987	992	1016	1022	84
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	190	198	83
7	219	228	248	257	279	287	305	317	334	346	363	376	82
8	392	405	421	435	449	465	478	495	507	524	536	554	81
9	564	584	593	614	622	644	650	673	679	703	708	733	80
10	736	763	765	793	794	823	822	853	851	883	880	914	79
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2095	78
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	278	77
13	250	309	278	339	306	370	334	401	363	432	391	462	76
14	419	493	447	524	476	555	504	586	532	617	560	648	75
15	588	679	616	711	644	742	672	773	700	805	728	836	74
16	756	867	784	899	812	931	840	962	868	994	896	3026	73
17	924	3057	952	3089	939	3121	3007	3153	3035	3185	3062	217	72
18	3090	249	3118	281	3145	314	173	346	201	378	228	411	71
19	256	443	283	476	311	508	338	541	365	574	393	607	70
20	420	640	448	673	475	706	502	739	529	772	557	805	69
21	584	839	611	872	638	906	665	939	692	973	719	4006	68
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	210	67
23	907	245	934	279	961	314	987	348	4014	383	4041	417	66
24	4067	452	4094	487	4120	522	4147	557	173	592	200	628	65
25	226	663	253	699	279	734	305	770	331	806	358	841	64
26	384	877	410	913	436	950	4462	986	488	5022	514	5059	63
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	62
28	695	317	720	354	746	392	772	430	797	467	823	505	61
29	848	543	874	581	899	619	924	658	950	696	975	735	60
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	59
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	58
32	299	249	324	289	348	330	5373	371	398	412	422	453	57
33	446	494	471	536	495	577	519	619	544	661	568	703	56
34	592	745	616	787	640	830	664	873	688	916	712	959	55
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	54
36	878	265	901	310	925	355	948	400	972	445	995	490	53
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	52
38	157	813	180	860	202	907	225	954	248	8002	271	8050	51
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	50
40	428	391	450	441	472	491	494	541	517	591	539	642	49
41	561	693	583	744	604	796	626	847	648	899	670	952	48
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	47
43	820	325	841	380	862	435	884	490	905	545	926	601	46
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	45
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	44
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	20 cot	10′ cos	10′ cot	deg.

TABLE VI (continued)

SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
										1.2203			
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	.2647	7753	1.2276	39
51	771	2349	790	.2423	808	.2497	826	.2572	844	.3111	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3597	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.4106	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4641	175	.4193	35
55	192	4281	208	.4370	225	.4460	241	.4550	258	.5204	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5798	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.6426	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.7090	557	.6534	31
59	572	.6643	587	.6753	601	.6864	61	.6977	631		646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8376	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	845	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	9995	31.242	9996	34.368	997	38.189	997	42.964	9998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	30′ cot	10′ cos	10′ cot	deg.

TABLE VII

RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16—6	21	346—6	41	676—6	61	1006—6	81	1336—6
2	33—0	22	363—0	42	693—0	62	1023—0	82	1353—0
3	49—6	23	379—6	43	709—6	63	1039—6	83	1369—6
4	66—0	24	396—0	44	726—0	64	1056—0	84	1386—0
5	82—6	25	412—6	45	742—6	65	1072—6	85	1402—6
6	99—0	26	429—0	46	759—0	66	1089—0	86	1419—0
7	115—6	27	445—6	47	775—6	67	1105—6	87	1435—6
8	132—0	28	462—0	48	792—0	68	1122—0	88	1452—0
9	148—6	29	478—6	49	808—6	69	1138—6	89	1468—6
10	165—0	30	495—0	50	825—0	70	1155—0	90	1485—0
11	181—6	31	511—6	51	841—6	71	1171—6	91	1501—6
12	198—0	32	528—0	52	858—0	72	1188—0	92	1518—0
13	214—6	33	544—6	53	874—6	73	1204—6	93	1534—6
14	231—0	34	561—0	54	891—0	74	1221—0	94	1551—0
15	247—6	35	577—6	55	907—6	75	1237—6	95	1567—6
16	264—0	36	594—0	56	924—0	76	1254—0	96	1584—0
17	280—6	37	610—6	57	940—6	77	1270—6	97	1600—6
18	297—0	38	627—0	58	957—0	78	1287—0	98	1617—0
19	313—6	39	643—6	59	973—6	79	1303—6	99	1633—6
20	330—0	40	660—0	60	990—0	80	1320—0	100	1650—0

TABLE VIII

LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0- 7.92	18	11-10.56	35	23- 1.20	52	34- 3.84	69	45- 6.48	86	56- 9.12
2	1- 3.84	19	12- 6.48	36	23- 9.12	53	34-11.76	70	46- 2.40	87	57- 5.04
3	1-11.76	20	13- 2.40	37	24- 5.04	54	35- 7.68	71	46-10.32	88	58- 0.96
4	2- 7.68	21	13-10.32	38	25- 0.96	55	36- 3.60	72	47- 6.24	89	58- 8.88
5	3- 3.60	22	14- 6.24	39	25- 8.88	56	36-11.52	73	48- 2.16	90	59- 4.80
6	3-11.52	23	15- 2.16	40	26- 4.80	57	37- 7.44	74	48-10.08	91	60- 0.72
7	4- 7.44	24	15-10.08	41	27- 0.72	58	38- 3.36	75	49- 6.00	92	60- 8.64
8	5- 3.36	25	16- 6.00	42	27- 8.64	59	38-11.28	76	50- 1.92	93	61- 4.56
9	5-11.28	26	17- 1.92	43	28- 4.56	60	39- 7.20	77	50- 9.84	94	62- 0.48
10	6- 7.20	27	17- 9.84	44	29- 0.48	61	40- 3.12	78	51- 5.76	95	62- 8.40
11	7- 3.12	28	18- 5.76	45	29- 8.40	62	40-11.04	79	52- 1.68	96	63- 4.32
12	7-11.04	29	19- 1.68	46	30- 4.32	63	41- 6.96	80	52- 9.60	97	64- 0.24
13	8- 6.96	30	19- 9.60	47	31- 0.24	64	42- 2.88	81	53- 5.52	98	64- 8.16
14	9- 2.88	31	20- 5.52	48	31- 8.16	65	42-10.80	82	54- 1.44	99	65- 4.08
15	9-10.80	32	21- 1.44	49	32- 4.08	66	43- 6.72	83	54- 9.36	100	66- .000
16	10- 6.72	33	21- 9.36	50	33- 0.00	67	44- 2.64	84	55- 5.28	101	66 -7 92
17	11- 2.64	34	22- 5.28	51	33- 7.92	68	44-10.56	85	56- 1.20	102	67- 3.84

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10′	58.34	.297	5° C.	10′	560.11	27.313	5° C	10′	1070.6	99.155	5° C
20′	66.67	.388	T	20′	568.53	28.137	T	20′	1079.2	100.75	T
30′	75.01	.491	.03	30′	576.95	28.974	.06	30′	1087.8	102.35	.10
40′	83.34	.606	E	40′	585.36	29.824	E	40′	1096.4	103.97	E
50′	91.68	.733		50′	593.79	30.686		50′	1105.1	105.60	
2°	100.01	.873	.001	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10′	108.35	1.024		10′	610.64	32.447		10′	1122.4	108.90	
20′	116.68	1.188		20′	619.07	33.347		20′	1131.0	110.57	
30′	125.02	1.364		30′	627.50	34.259		30′	1139.7	112.25	
40′	133.36	1.552		40′	635.93	35.183		40′	1148.4	113.95	
50′	141.70	1.752		50′	644.37	36.120		50′	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10′	158.38	2.188	T	10′	661.25	38.031	T	10′	1174.4	119.12	T
20′	166.72	2.425	.06	20′	669.70	39.006	.13	20′	1183.1	120.87	.19
30′	175.06	2.674	E	30′	678.15	39.993	E	30′	1191.8	122.63	E
40′	183.40	2.934	.003	40′	686.60	40.992	.011	40′	1200.5	124.41	.025
50′	191.74	3.207		50′	695.06	42.004		50′	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10′	208.43	3.790		10′	711.97	44.066		10′	1226.6	129.82	
20′	216.77	4.099		20′	720.44	45.116		20′	1235.3	131.65	
30′	225.12	4.421		30′	728.90	46.178		30′	1244.0	133.50	
40′	233.47	4.755		40′	737.37	47.253		40′	1252.8	135.35	
50′	241.81	5.100	15° C.	50′	745.85	48.341	15° C.	50′	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10′	258.51	5.829	.09	10′	762.80	50.554	.19	10′	1279.0	141.01	.29
20′	266.86	6.211	E	20′	771.29	51.679	E	20′	1287.7	142.93	E
30′	275.21	6.606	.004	30′	779.77	52.818	.017	30′	1296.5	144.85	.038
40′	283.57	7.013		40′	788.26	53.969		40′	1305.3	146.79	
50′	291.92	7.432		50′	796.75	55.132		50′	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10′	308.64	8.307		10′	813.75	57.498		10′	1331.6	152.69	
20′	316.99	8.762		20′	822.25	58.699		20′	1340.4	154.69	
30′	325.35	9.230		30′	830.76	59.914		30′	1349.2	156.70	
40′	333.71	9.710	20° C.	40′	839.27	61.141	20° C.	40′	1358.0	158.72	20° C.
50′	342.08	10.202	T	50′	847.78	62.381	T	50′	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10′	358.81	11.224	E	10′	864.82	64.900	E	10′	1384.4	164.86	E
20′	367.17	11.753	.006	20′	873.35	66.178	.022	20′	1393.2	166.95	.051
30′	375.54	12.294		30′	881.88	67.470		30′	1402.0	169.04	
40′	383.91	12.847		40′	890.41	68.774		40′	1410.9	171.15	
50′	392.28	13.413		50′	898.95	70.091		50′	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10′	409.03	14.582	25° C.	10′	916.03	72.764	25° C.	10′	1437.4	177.55	25° C.
20′	417.41	15.184	T	20′	924.58	74.119	T	20′	1446.3	179.72	T
30′	425.79	15.799	.16	30′	933.13	75.488	.32	30′	1455.1	181.89	.49
40′	434.17	16.426	E	40′	941.69	76.869	E	40′	1464.0	184.08	E
50′	442.55	17.065		50′	950.25	78.264		50′	1472.9	186.29	
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10′	459.32	18.381		10′	967.38	81.092		10′	1490.7	190.74	
20′	467.71	19.058		20′	975.96	82.525		20′	1499.6	192.99	
30′	476.10	19.746		30′	984.53	83.972		30′	1508.5	195.25	
40′	484.49	20.447		40′	993.12	85.431		40′	1517.4	197.53	
50′	492.88	21.161		50′	1001.7	86.904		50′	1526.3	199.82	
10°	501.28	21.887	30° C.	20°	1010.3	88.389	30° C.	30°	1535.3	202.12	30° C.
10′	509.68	22.624	T	10′	1018.9	89.888	T	10′	1544.2	204.44	T
20′	518.08	23.375	.19	20′	1027.5	91.399	.39	20′	1553.1	206.77	.59
30′	526.48	24.138	E	30′	1036.1	92.924	E	30′	1562.1	209.12	E
40′	534.89	24.913	.008	40′	1044.7	94.462	.034	40′	1571.0	211.48	.078
50′	543.29	25.700		50′	1053.3	96.013		50′	1580.0	213.86	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

TABLE VII
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16—6	21	346—6	41	676—6	61	1006—6	81	1336—6
2	33—0	22	363—0	42	693—0	62	1023—0	82	1353—0
3	49—6	23	379—6	43	709—6	63	1039—6	83	1369—6
4	66—0	24	396—0	44	726—0	64	1056—0	84	1386—0
5	82—6	25	412—6	45	742—6	65	1072—6	85	1402—6
6	99—0	26	429—0	46	759—0	66	1089—0	86	1419—0
7	115—6	27	445—6	47	775—6	67	1105—6	87	1435—6
8	132—0	28	462—0	48	792—0	68	1122—0	88	1452—0
9	148—6	29	478—6	49	808—6	69	1138—6	89	1468—6
10	165—0	30	495—0	50	825—0	70	1155—0	90	1485—0
11	181—6	31	511—6	51	841—6	71	1171—6	91	1501—6
12	198—0	32	528—0	52	858—0	72	1188—0	92	1518—0
13	214—6	33	544—6	53	874—6	73	1204—6	93	1534—6
14	231—0	34	561—0	54	891—0	74	1221—0	94	1551—0
15	247—6	35	577—6	55	907—6	75	1237—6	95	1567—6
16	264—0	36	594—0	56	924—0	76	1254—0	96	1584—0
17	280—6	37	610—6	57	940—6	77	1270—6	97	1600—6
18	297—0	38	627—0	58	957—0	78	1287—0	98	1617—0
19	313—6	39	643—6	59	973—6	79	1303—6	99	1633—6
20	330—0	40	660—0	60	990—0	80	1320—0	100	1650—0

TABLE VIII
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0- 7.92	18	11-10.56	35	23- 1.20	52	34- 3.84	69	45- 6.48	86	56- 9.12
2	1- 3.84	19	12- 6.48	36	23- 9.12	53	34-11.76	70	46- 2.40	87	57- 5.04
3	1-11.76	20	13- 2.40	37	24- 5.04	54	35- 7.68	71	46-10.32	88	58- 0.96
4	2- 7.68	21	13-10.32	38	25- 0.96	55	36- 3.60	72	47- 6.24	89	58- 8.88
5	3- 3.60	22	14- 6.24	39	25- 8.88	56	36-11.52	73	48- 2.16	90	59- 4.80
6	3-11.52	23	15- 2.16	40	26- 4.80	57	37- 7.44	74	48-10.08	91	60- 0.72
7	4- 7.44	24	15-10.08	41	27- 0.72	58	38- 3.36	75	49- 6.00	92	60- 8.64
8	5- 3.36	25	16- 6.00	42	27- 8.64	59	38-11.28	76	50- 1.92	93	61- 4.56
9	5-11.28	26	17- 1.92	43	28- 4.56	60	39- 7.20	77	50- 9.84	94	62- 0.48
10	6- 7.20	27	17- 9.84	44	29- 0.48	61	40- 3.12	78	51- 5.76	95	62- 8.40
11	7- 3.12	28	18- 5.76	45	29- 8.40	62	40-11.04	79	52- 1.68	96	63- 4.32
12	7-11.04	29	19- 1.68	46	30- 4.32	63	41- 6.96	80	52- 9.60	97	64- 0.24
13	8- 6.96	30	19- 9.60	47	31- 0.24	64	42- 2.88	81	53- 5.52	98	64- 8.16
14	9- 2.88	31	20- 5.52	48	31- 8.16	65	42-10.80	82	54- 1.44	99	65- 4.08
15	9-10.80	32	21- 1.44	49	32- 4.08	66	43- 6.72	83	54- 9.36	100	66- .000
16	10- 6.72	33	21- 9.36	50	33- 0.00	67	44- 2.64	84	55- 5.28	101	66 -7 92
17	11- 2.64	34	22- 5.28	51	33- 7.92	68	44-10.56	85	56- 1.20	102	67- 3.84

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10′	58.34	.297	5° C.	10′	560.11	27.313	5° C	10′	1070.6	99.155	5° C
20′	66.67	.388	T	20′	568.53	28.137	T	20′	1079.2	100.75	T
30′	75.01	.491	.03	30′	576.95	28.974	.06	30′	1087.8	102.35	.10
40′	83.34	.606	E	40′	585.36	29.824	E	40′	1096.4	103.97	E
50′	91.68	.733		50′	593.79	30.686		50′	1105.1	105.60	
2°	100.01	.873	.001	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10′	108.35	1.024		10′	610.64	32.447		10′	1122.4	108.90	
20′	116.68	1.188		20′	619.07	33.347		20′	1131.0	110.57	
30′	125.02	1.364		30′	627.50	34.259		30′	1139.7	112.25	
40′	133.36	1.552		40′	635.93	35.183		40′	1148.4	113.95	
50′	141.70	1.752		50′	644.37	36.120		50′	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10′	158.38	2.188	T	10′	661.25	38.031	T	10′	1174.4	119.12	T
20′	166.72	2.425	.06	20′	669.70	39.006	.13	20′	1183.1	120.87	.19
30′	175.06	2.674	E	30′	678.15	39.993	E	30′	1191.8	122.63	E
40′	183.40	2.934	.003	40′	686.60	40.992	.011	40′	1200.5	124.41	.025
50′	191.74	3.207		50′	695.06	42.004		50′	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10′	208.43	3.790		10′	711.97	44.066		10′	1226.6	129.82	
20′	216.77	4.099		20′	720.44	45.116		20′	1235.3	131.65	
30′	225.12	4.421		30′	728.90	46.178		30′	1244.0	133.50	
40′	233.47	4.755		40′	737.37	47.253		40′	1252.8	135.35	
50′	241.81	5.100	15° C.	50′	745.85	48.341	15° C.	50′	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10′	258.51	5.829	.09	10′	762.80	50.554	.19	10′	1279.0	141.01	.29
20′	266.86	6.211	E	20′	771.29	51.679	E	20′	1287.7	142.93	E
30′	275.21	6.606	.004	30′	779.77	52.818	.017	30′	1296.5	144.85	.038
40′	283.57	7.013		40′	788.26	53.969		40′	1305.3	146.79	
50′	291.92	7.432		50′	796.75	55.132		50′	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10′	308.64	8.307		10′	813.75	57.498		10′	1331.6	152.69	
20′	316.99	8.762		20′	822.25	58.699		20′	1340.4	154.69	
30′	325.35	9.230		30′	830.76	59.914		30′	1349.2	156.70	
40′	333.71	9.710	20° C.	40′	839.27	61.141	20° C.	40′	1358.0	158.72	20° C.
50′	342.08	10.202	T	50′	847.78	62.381	T	50′	1366.8	160.76	T
			.13				.26				.39
7°	350.44	10.707	E	17°	856.30	63.634	E	27°	1375.6	162.81	E
10′	358.81	11.224	.006	10′	864.82	64.900	.022	10′	1384.4	164.86	.051
20′	367.17	11.753		20′	873.35	66.178		20′	1393.2	166.95	
30′	375.54	12.294		30′	881.88	67.470		30′	1402.0	169.04	
40′	383.91	12.847		40′	890.41	68.774		40′	1410.9	171.15	
50′	392.28	13.413		50′	898.95	70.091		50′	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10′	409.03	14.582	25° C.	10′	916.03	72.764	25° C.	10′	1437.4	177.55	25° C.
20′	417.41	15.184	T	20′	924.58	74.119	T	20′	1446.3	179.72	T
30′	425.79	15.799	.16	30′	933.13	75.488	.32	30′	1455.1	181.89	.49
40′	434.17	16.426	E	40′	941.69	76.869	E	40′	1464.0	184.08	E
50′	442.55	17.065		50′	950.25	78.264		50′	1472.9	186.29	
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10′	459.32	18.381		10′	967.38	81.092		10′	1490.7	190.74	
20′	467.71	19.058		20′	975.96	82.525		20′	1499.6	192.99	
30′	476.10	19.746		30′	984.53	83.972		30′	1508.5	195.25	
40′	484.49	20.447		40′	993.12	85.431		40′	1517.4	197.53	
50′	492.88	21.161		50′	1001.7	86.904		50′	1526.3	199.82	
10°	501.28	21.887	30° C.	20°	1010.3	88.389	30° C.	30°	1535.3	202.12	30° C.
10′	509.68	22.624	T	10′	1018.9	89.888	T	10′	1544.2	204.44	T
20′	518.08	23.375	.19	20′	1027.5	91.399	.39	20′	1553.1	206.77	.59
30′	526.48	24.138	E	30′	1036.1	92.924	E	30′	1562.1	209.12	E
40′	534.89	24.913	.008	40′	1044.7	94.462	.034	40′	1571.0	211.48	.078
50′	543.29	25.700		50′	1053.3	96.013		50′	1580.0	213.86	

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10′	5847.5	2457.1	5° C.	10′	6971.3	3294.1	5° C.	10′	8362.7	4407.6	5° C.
20′	5864.6	2469.3	T	20′	6992.0	3310.1	T	20′	8388.9	4429.2	T
30′	5881.7	2481.5	.43	30′	7012.7	3326.1	.51	30′	8415.1	4450.9	.62
40′	5898.8	2493.8	E	40′	7033.6	3342.3	E	40′	8441.5	4472.7	E
50′	5916.0	2506.1		50′	7054.5	3358.5		50′	8468.0	4494.6	
92°	5933.2	2518.5	.200	102°	7075.5	3374.9	.268	112°	8494.6	4516.6	.360
10′	5950.5	2531.0		10′	7096.6	3391.2		10′	8521.3	4538.8	
20′	5967.9	2543.5		20′	7117.8	3407.7		20′	8548.1	4561.1	
30′	5985.3	2556.0		30′	7139.0	3424.3		30′	8575.0	4583.4	
40′	6002.7	2568.6		40′	7160.3	3440.9		40′	8602.1	4606.0	
50′	6020.2	2581.3		50′	7181.7	3457.6		50′	8629.3	4628.6	
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10′	6055.4	2606.8	T	10′	7224.7	3491.3	T	10′	8684.0	4674.2	T
20′	6073.1	2619.7	.86	20′	7246.3	3508.2	.103	20′	8711.5	4697.2	1.25
30′	6090.8	2632.6	E	30′	7268.0	3525.2	E	30′	8739.2	4720.3	E
40′	6108.6	2645.5	.401	40′	7289.8	3542.4	.536	40′	8767.0	4743.6	.721
50′	6126.4	2658.5		50′	7311.7	3559.6		50′	8794.9	4766.9	
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10′	6162.2	2684.7		10′	7355.6	3594.2		10′	8851.0	4814.1	
20′	6180.2	2697.9		20′	7377.8	3611.7		20′	8879.3	4837.8	
30′	6198.3	2711.2		30′	7399.9	3629.2		30′	8907.7	4861.7	
40′	6216.4	2724.5		40′	7422.2	3646.8		40′	8936.3	4885.7	
50′	6234.6	2737.9	15° C.	50′	7444.6	3664.5	15° C.	50′	8965.0	4909.9	15° C.
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10′	6271.1	2764.8	1.30	10′	7489.6	3700.2	1.56	10′	9022.7	4958.6	1.93
20′	6289.4	2778.3	E	20′	7512.2	3718.2	E	20′	9051.7	4983.1	E
30′	6307.9	2792.0	.604	30′	7534.9	3736.2	.806	30′	9080.9	5007.8	1.09
40′	6326.3	2805.6		40′	7557.7	3754.4		40′	9110.3	5032.6	
50′	6344.8	2819.4		50′	7580.5	3772.6		50′	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10′	6382.1	2847.0		10′	7626.6	3809.4		10′	9199.1	5107.9	
20′	6400.8	2861.0		20′	7649.7	3827.9		20′	9229.0	5133.3	
30′	6419.5	2875.0		30′	7672.9	3846.5		30′	9259.0	5158.8	
40′	6438.4	2889.0	20° C.	40′	7696.3	3865.2	20° C.	40′	9289.2	5184.5	20° C.
50′	6457.3	2903.1	T	50′	7719.7	3884.0	T	50′	9319.5	5210.3	T
			1.74				2.08				2.52
97°	6476.2	2917.3	E	107°	7743.2	3902.9	E	117°	9349.9	5236.2	E
10′	6495.2	2931.6	.809	10′	7766.8	3921.9	1.08	10′	9380.5	5262.3	1.46
20′	6514.3	2945.9		20′	7790.5	3940.9		20′	9411.3	5288.6	
30′	6533.4	2960.3		30′	7814.3	3960.1		30′	9442.2	5315.0	
40′	6552.6	2974.7		40′	7838.1	3979.4		40′	9473.2	5341.5	
50′	6571.9	2989.2		50′	7862.1	3998.7		50′	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10′	6610.6	3018.4	25° C.	10′	7910.4	4037.8	25° C.	10′	9567.2	5422.1	25° C.
20′	6630.1	3033.1	T	20′	7934.6	4057.4	T	20′	9598.9	5449.2	T
30′	6649.6	3047.9	2.18	30′	7959.0	4077.2	2.61	30′	9630.7	5476.5	3.16
40′	6669.2	3062.8	E	40′	7983.5	4097.1	E	40′	9662.6	5504.0	E
50′	6688.8	3077.7		50′	8008.0	4117.0		50′	9694.7	5531.7	
99°	6708.6	3092.7	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10′	6728.4	3107.7		10′	8057.4	4157.3		10′	9759.4	5587.4	
20′	6748.2	3122.9		20′	8082.3	4177.5		20′	9792.0	5615.5	
30′	6768.1	3138.1		30′	8107.3	4197.9		30′	9824.8	5643.8	
40′	6788.1	3153.3		40′	8132.3	4218.4		40′	9857.7	5672.3	
50′	6808.2	3168.7		50′	8157.5	4239.0		50′	9890.8	5700.9	
100°	6828.3	3184.1	30° C.	110°	8182.8	4259.7	30° C.	120°	9924.0	5729.7	30° C.
10′	6848.5	3199.6	T	10′	8208.2	4280.5	T	10′	9957.5	5758.6	T
20′	6868.8	3215.1	2.62	20′	8233.7	4301.4	3.14	20′	9991.0	5787.7	3.81
30′	6889.2	3230.8	E	30′	8259.3	4322.4	E	30′	10025.0	5817.0	E
40′	6909.6	3246.5	1.22	40′	8285.0	4343.6	1.63	40′	10059.0	5846.5	2.20
50′	6930.1	3262.3		50′	8310.8	4364.8		50′	10093.0	5876.1	

T = R tan ½ I E = R exsec ½ I

Table X.

MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0–20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0–40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1–0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1–20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1–40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2–0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2–20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2–40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3–0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3–20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3–40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4–0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4–20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4–40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

Table XI.

SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

Table IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10′	5847.5	2457.1	5° C.	10′	6971.3	3294.1	5° C.	10′	8362.7	4407.6	5° C.
20′	5864.6	2469.3	T	20′	6992.0	3310.1	T	20′	8388.9	4429.2	T
30′	5881.7	2481.5	.43	30′	7012.7	3326.1	.51	30′	8415.1	4450.9	.62
40′	5898.8	2493.8	E	40′	7033.6	3342.3	E	40′	8441.5	4472.7	E
50′	5916.0	2506.1	.200	50′	7054.5	3358.5		50′	8468.0	4494.6	.360
92°	5933.2	2518.5		102°	7075.5	3374.9	.268	112°	8494.6	4516.6	
10′	5950.5	2531.0		10′	7096.6	3391.2		10′	8521.3	4538.8	
20′	5967.9	2543.5		20′	7117.8	3407.7		20′	8548.1	4561.1	
30′	5985.3	2556.0		30′	7139.0	3424.3		30′	8575.0	4583.4	
40′	6002.7	2568.6		40′	7160.3	3440.9		40′	8602.1	4606.0	
50′	6020.2	2581.3		50′	7181.7	3457.6		50′	8629.3	4628.6	
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10′	6055.4	2606.8	T	10′	7224.7	3491.3	T	10′	8684.0	4674.2	T
20′	6073.1	2619.7	.86	20′	7246.3	3508.2	.103	20′	8711.5	4697.2	1.25
30′	6090.8	2632.6	E	30′	7268.0	3525.2	E	30′	8739.2	4720.3	E
40′	6108.6	2645.5	.401	40′	7289.8	3542.4	.536	40′	8767.0	4743.6	.721
50′	6126.4	2658.5		50′	7311.7	3559.6		50′	8794.9	4766.9	
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10′	6162.2	2684.7		10′	7355.6	3594.2		10′	8851.0	4814.1	
20′	6180.2	2697.9		20′	7377.8	3611.7		20′	8879.3	4837.8	
30′	6198.3	2711.2		30′	7399.9	3629.2		30′	8907.7	4861.7	
40′	6216.4	2724.5		40′	7422.2	3646.8		40′	8936.3	4885.7	
50′	6234.6	2737.9	15° C.	50′	7444.6	3664.5	15° C.	50′	8965.0	4909.9	15° C.
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10′	6271.1	2764.8	1.30	10′	7489.6	3700.2	1.56	10′	9022.7	4958.6	1.93
20′	6289.4	2778.3	E	20′	7512.2	3718.2	E	20′	9051.7	4983.1	E
30′	6307.9	2792.0	.604	30′	7534.9	3736.2	.806	30′	9080.9	5007.8	1.09
40′	6326.3	2805.6		40′	7557.7	3754.4		40′	9110.3	5032.6	
50′	6344.8	2819.4		50′	7580.5	3772.6		50′	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10′	6382.1	2847.0		10′	7626.6	3809.4		10′	9199.1	5107.9	
20′	6400.8	2861.0		20′	7649.7	3827.9		20′	9229.0	5133.3	
30′	6419.5	2875.0	20° C.	30′	7672.9	3846.5	20° C.	30′	9259.0	5158.8	20° C.
40′	6438.4	2889.0	T	40′	7696.3	3865.2	T	40′	9289.2	5184.5	T
50′	6457.3	2903.1	1.74	50′	7719.7	3884.0	2.08	50′	9319.5	5210.3	2.52
97°	6476.2	2917.3	E	107°	7743.2	3902.9	E	117°	9349.9	5236.2	E
10′	6495.2	2931.6	.809	10′	7766.8	3921.9	1.08	10′	9380.5	5262.3	1.46
20′	6514.3	2945.9		20′	7790.5	3940.9		20′	9411.3	5288.6	
30′	6533.4	2960.3		30′	7814.3	3960.1		30′	9442.2	5315.0	
40′	6552.6	2974.7		40′	7838.1	3979.4		40′	9473.2	5341.5	
50′	6571.9	2989.2		50′	7862.1	3998.7		50′	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10′	6610.6	3018.4	25° C.	10′	7910.4	4037.8	25° C.	10′	9567.2	5422.1	25° C.
20′	6630.1	3033.1	T	20′	7934.6	4057.4	T	20′	9598.9	5449.2	T
30′	6649.6	3047.9	2.18	30′	7959.0	4077.2	2.61	30′	9630.7	5476.5	3.16
40′	6669.2	3062.8	E	40′	7983.5	4097.1	E	40′	9662.6	5504.0	E
50′	6688.8	3077.7	1.02	50′	8008.0	4117.0		50′	9694.7	5531.7	1.83
99°	6708.6	3092.7		109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	
10′	6728.4	3107.7		10′	8057.4	4157.3		10′	9759.4	5587.4	
20′	6748.2	3122.9		20′	8082.3	4177.5		20′	9792.0	5615.5	
30′	6768.1	3138.1		30′	8107.3	4197.9		30′	9824.8	5643.8	
40′	6788.1	3153.3		40′	8132.3	4218.4		40′	9857.7	5672.3	
50′	6808.2	3168.7		50′	8157.5	4239.0		50′	9890.8	5700.9	
100°	6828.3	3184.1	30° C.	110°	8182.8	4259.7	30° C.	120°	9924.0	5729.7	30° C.
10′	6848.5	3199.6	T	10′	8208.2	4280.5	T	10′	9957.5	5758.6	T
20′	6868.8	3215.1	2.62	20′	8233.7	4301.4	3.14	20′	9991.0	5787.7	3.81
30′	6889.2	3230.8	E	30′	8259.3	4322.4	E	30′	10025.0	5817.0	E
40′	6909.6	3246.5	1.22	40′	8285.0	4343.6	1.63	40′	10059.0	5846.5	2.20
50′	6930.1	3262.3		50′	8310.8	4364.8		50′	10093.0	5876.1	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

Table X.

MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0–20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0–40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1–0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1–20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1–40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2–0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2–20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2–40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3–0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3–20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3–40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4–0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4–20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4–40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

Table XI.

SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

Table XII.

INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

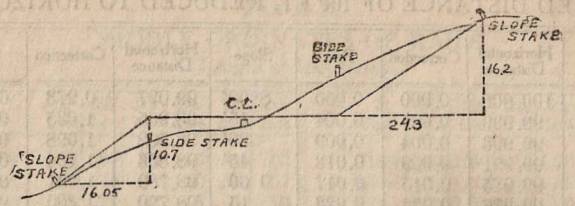
Slope	Horizontal Distance	Correction	Rise	Slope	Horizontal Distance	Correction	Rise
0°00′	100.000	0.000	0.000	8°00′	99.027	0.973	0.139
15′	99.999	0.001	0.004	15′	98.965	1.035	0.143
30′	99.996	0.004	0.009	30′	98.902	1.098	0.148
45′	99.991	0.009	0.013	45′	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

For each foot take one one-hundredth of each reading.

Table XIII.

MINUTES IN DECIMALS OF A DEGREE.

0 30″	.00833	10′ 30″	.17500	20′ 30″	.34167	30′ 10″	.50833	40′ 30″	.67500	50′ 10″	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1 65	1 80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3 45	3.60	3 75	3.90	4.05	4.20	4 35	2
3	4.50	4 65	4.80	4.95	5 10	5 25	5 40	5.55	5.70	5.85	3
4	6.00	6 15	6.30	6.45	6.60	6 75	6.90	7.05	7.20	7.35	4
5	7 50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9 00	9 15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10 65	10.80	10.95	11.10	11.25	11.40	11.55	11 70	11.85	7
8	12.00	12 15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13 50	13.65	13 80	13 95	14.10	14.25	14.40	14 55	14.70	14.85	9
10	15.00	15 15	15 30	15 45	15.60	15.75	15.90	16.05	16.20	16 35	10
11	16 50	16 65	16 80	16.95	17 10	17.25	17.40	17.55	17.70	17.85	11
12	18 00	18 15	18.30	18 45	18.60	18 75	18.90	19.05	19.20	19 35	12
13	19 50	19 65	19.80	19.95	20.10	20.25	20 40	20.55	20.70	20.85	13
14	21.00	21 15	21.30	21.45	21 60	21.75	21.90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24 15	24 30	24 45	24.60	24.75	24 90	25 05	25.20	25.35	16
17	25.50	25 65	25.80	25 95	26.10	26 25	26 40	26.55	26.70	26.85	17
18	27.00	27 15	27.30	27 45	27.60	27.75	27.90	28.05	28 20	28.35	18
19	28 50	28 65	28 80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30 00	30 15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31 50	31 65	31.80	31.95	32 10	32 25	32.40	32.55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33.60	33 75	33.90	34.05	34.20	34.35	22
23	34 50	34 65	34.80	34.95	35.10	35 25	35 40	35.55	35.70	35 85	23
24	36.00	36 15	36.30	36 45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37 80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39 00	39 15	39.30	39 45	39 60	39.75	39.90	40.05	40.20	40.35	26
27	40 50	40 65	40 80	40.95	41.10	41.25	41 40	41.55	41.70	41.85	27
28	42 00	42 15	42.30	42.45	42.60	42 75	42.90	43.05	43.20	43.35	28
29	43 50	43 65	43.80	43 95	44.10	44 25	44 40	44.55	44.70	44 85	29
30	45 00	45 15	45.30	45 45	45.60	45.75	45.90	46.05	46 20	46.35	30
31	46.50	46.65	46.80	46 95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48 00	48.15	48.30	48 45	48.60	48 75	48.90	49.05	49 20	49.35	32
33	49.50	49 65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51 00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52 50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54 00	54.15	54.30	54 45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55 50	55 65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57 00	57.15	57.30	57 45	57.60	57.75	57.90	58.05	58.20	58 35	38
39	58 50	58.65	58 80	58.95	59.10	59 25	59.40	59 55	59.70	59.85	39
40	60 00	60 15	60 30	60 45	60 60	60.75	60 90	61.05	61 20	61.35	40
41	61.50	61 65	61 80	61 95	62 10	62 25	62.40	62 55	62 70	62.85	41
42	63 00	63.15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64.35	42
43	64.50	64 65	64 80	64.95	65.10	65 25	65 40	65.55	65.70	65.85	43
44	66 00	66 15	66.30	66.45	66.60	66.75	66.90	67.05	67.20	67.35	44
45	67 50	67 65	67 80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69 00	69 15	69 30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70 50	70 65	70 80	70 95	71.10	71.25	71 40	71.55	71.70	71.85	47
48	72.00	72 15	72.30	72.45	72.60	72.75	72.90	73 05	73.20	73 35	48
49	73 50	73 65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

Number Chgs Co. Map

Cave Rd = 47 & 92 to 157

Mulberry 96 to 39

Old Mill 15 to 92

Hale 21 to 15

Pekin (Pines #) 150 144 to

Cedar (Munson - Newbury Twp Line Rd) 104 to 98

Osmond to Fisher
#133 to #131

use #137 for Memorial Rd
= 136 now free

Clay Pipe

East end Shedd Rd
from #127 to #126
East end Patch Rd
from #206 to #205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