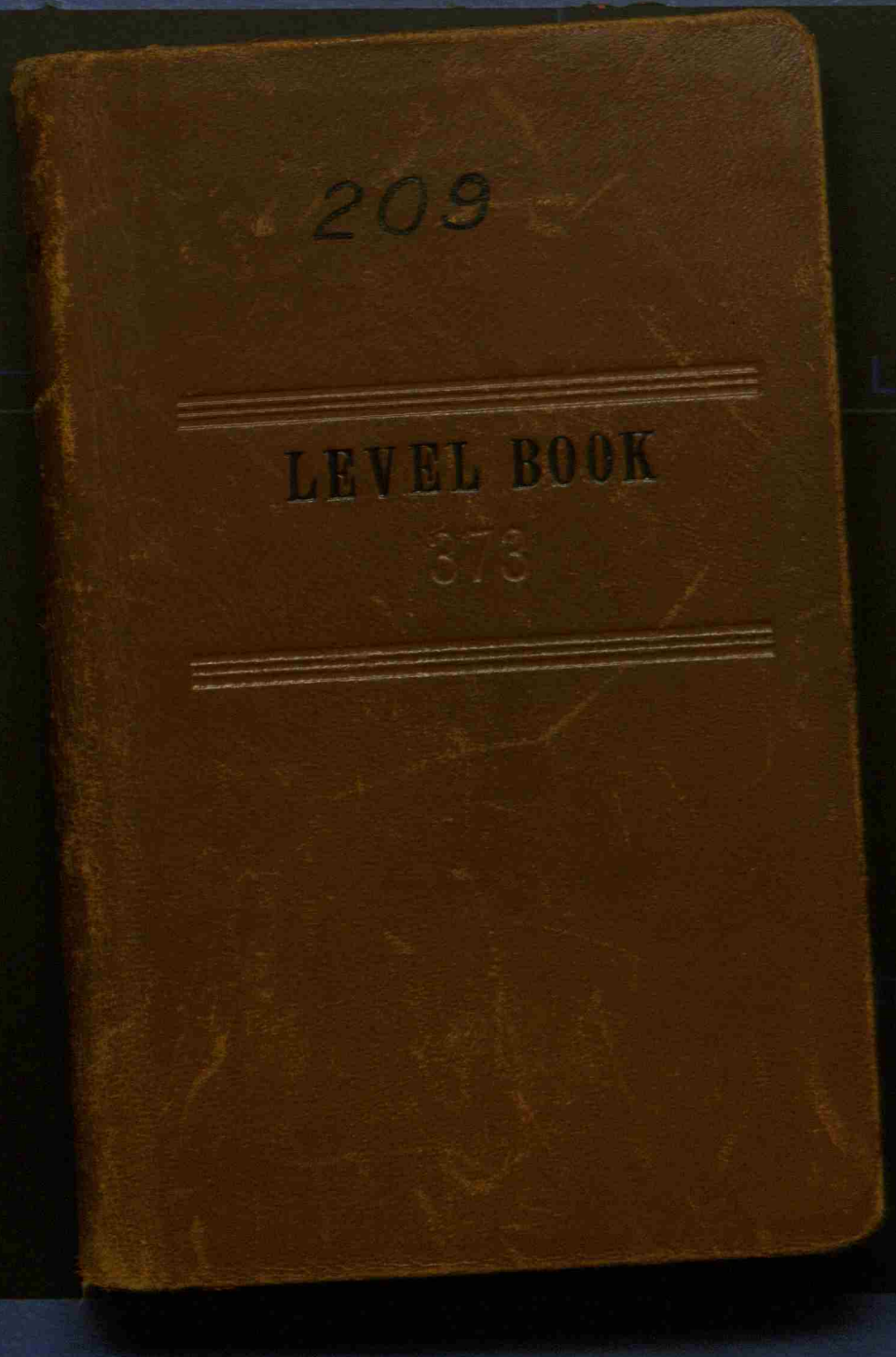

209
LEVEL BOOK
373

KEUFFEL & ESSER CO.

DRAWING MATERIALS
AND
SURVEYING INSTRUMENTS.
NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

209

County Surveyor
Danville, Indiana

Levels for Clarence Cox.

Sec

Mar 24 1947

Ophir Claypool.

Cloudy Temp 45°

Mr Cox wanted to find out if he had enough fall to drain pond about 200' E of N 45 road

Reading on bottom of pond	Reading on flow line of ditch at opening
7.67	10.30

As he wished to put the tile 1.75' below bottom of pond.

7.67 + 1.75 = 9.42

10.30 - 9.42' = .88' fall

Danville School Sewer

April 12, 1947

R.M. Franklin

Stanley Shartle

Sta	B.S.	H.I.	F.S.	Stake EL.	Proposed ditch EL.	6 cut.
0	6.10	105.26		—	99.16	0
0+50			1.48	103.78	97.50	6.28
1+0			3.03	102.23	95.84	6.39
1+50			5.45	99.81	94.18	5.63
2+0	1.94	95.94	Stake 11.26	94.00	92.52	1.48
2+0			Ditch 3.83	92.11	92.52	Fill 0.41
2+50			2.86	93.08	90.86	2.22
3+0			6.02	89.92	89.20	0.72
3+21			ditch 10.14	85.80	88.50	ht of outlet above town sewer 2.70
3+21			Stake 5.65	90.29	88.50	1.79

Franklin - rod
Shortle - T

Check levels for page 6. New stakes set.

Sta.	B.S.	H.I.	F.S.	Stake Elev.	ditch Elev	cut	
0+0	7.07	106.23		99.16	99.6	0	0
0+50			3.63	102.60	97.50	5.10	5'-1"
1+0			4.92	101.31	95.84	5.47	5'-5½"
1+50			7.72	98.51	94.18	4.33	4'-4"
2+0	3.31	97.30	12.24	93.99	92.52	1.47	1'-5½"
2+50			4.38	92.92	90.86	2.06	2'-1"
3+0			7.44	89.86	89.20	0.66	0'-8"
3+21			8.85	88.45	88.50	—	

Check levels for grading at Schoo
12 May 1947. Franklin-Shartle-Claypool

Sta.	B.S.	H.I.	F.S.	Elev.	Ground Elev.	Proposed Elev.	cut or fill
B.M.#6	0.77	896.26		895.49			
W. end pipe			10.42	885.84			
E. end pipe			12.11	884.15			
B.M.#6	5.73	901.22		895.49			
J2			3.00	898.22	897.0		C-1.2
J3			4.25	896.97	896.0		C-1.0
I2			3.43	897.79	897.5		C-0.3
I3			4.80	896.42	896.4		O.K.
H2			3.33	897.89	897.7		O.K.
H3			4.57	896.65	896.7		O.K.
G2			3.62	897.60	897.6		O.K.
G3			4.00	897.22	897.0		O.K.
F2			3.90	897.32	897.3		O.K.
F3			4.43	896.79	896.7		O.K.
E2			4.75	896.47	896.7		O.K.

901.22 − 3.33 = 897.89
12.11 − 10.42 = 1.69
896.26 + 10.42 = 885.84
896.26 − 12.11 = 884.15
901.22 − 4.57 = 896.65
901.22 − 4.25 = 896.97
895.49 − 5.73 = 901.22
901.22 − 4.80 = 896.42
901.22 − 3.62 = 897.60
901.22 − 3.43 = 897.79
901.22 − 8.90 = 897.32
901.22 − 4.75 = 896.47

Sta	B.S.	H.I.	F.S.	Ground Elev.	Proj. Elev.	
E3			5.18	896.04	895.7	O.K.
D1			3.05	898.17	898.1	F-0.7
D2			5.25	895.97	895.7	O.K.
B.M.2	4.55	921.33		916.78		
L16			6.50	914.83		
M16			6.90	914.43	908.5	cut 5.93
N16			6.25	915.08		
B.M.2	1.90	918.68		916.78		
B.M.6	1.73	897.22		895.49		
G7			7.58	889.64	892.7	F 3.1
H7			8.72	888.50	892.7	F 4.2
I7			8.72	888.50	892.5	F 4.0
J7			9.90	887.32	892.0	F 4.7
H8			8.35	888.87	891.5	F 2.6

901.22 − 5.18 = 896.04
901.22 − 3.05 = 898.17
901.22 − 5.25 = 895.97

916.78 + 4.55 = 921.33
914.43 − 908.50 = 5.93
921.33 − 6.50 = 914.83
921.33 − 6.90 = 914.43
921.33 − 6.25 = 915.08

~~921.33 − 906.60 = 15.33~~
916.78 + 1.90 = 918.68
895.49 + 1.73 = 897.22
897.22 − 8.72 = 888.50
897.22 − 9.90 = 887.32
897.22 − 8.35 = 888.87
892.7 − 888.5 = 4.2
892.7 − 889.6 = 3.1
892.5 − 891.5 = 1.0
892.0 − 889.3 = 2.7
892.7 − 888.7 = 4.0
892.0 − 887.3 = 4.7
891.5 − 888.9 = 2.6

H9			7.20	890.02	892.0		897.22	897.22
			5.44				1.20	5.44
							890.02	891.78

Levels for Major Franklin
E½ lot 1 block 34
orig Town of Danville.

Sta	B.S.	H.I.	F.S.	EL.	
B.M.	5.81	100.00	94.19		
storm sewer			8.60	91.40	
0+45			8.10	91.90	
0+80 middle of lot			8.16	91.84	
			3.70	96.30	
		100.00	1.25	98.75	
			3.06	96.94	
			6.13	93.87	C-2.6
			4.75	95.25	C-4.0
			6.34	93.66	C-2.4
			7.72	92.28	C-1.0
			11.23	88.77	
			9.38	90.62	

end of E curb & on St. 10' N of S. alley of orig town.

0.15
5
0.75% grade
.68
600
450
.510 fall

7.37
-.07
7.30
.15
7.15

80'
68
148'

Selge S walk Broadway @ W alley

63.08' W of above ground set NW cor house

" " NE " "

" " SE " "

" " SW " "

on top of bell of pipe ground at SW cor of lot.

Chas. E. McLain Ditch

2 & 3 - 15 - 2W

June 14, 1947

Major Franklin

Stanley Shartle

Ophir Claypool

Sta.	B.S.	H.I.	F.S.	EL.
B.M.#1	4.94	100.00		
			7.65 ?	92.35
0+00			8.86	91.14
			3.72	96.28
			5.68	94.32
1+0			3.52	96.48
			5.38	94.62
2+0			3.83	96.17
			6.03	93.97
3+0			3.72	96.28
			6.4	93.6
4+0			4.2	95.8
			6.9	93.1

EQUATION:

Elev. 117.55' old survey plans

= 96.58' this survey

20.97' diff.

top of headwall over tile - Elev 95.06

flowline tile at headwall

top of stake

bottom open ditch

on stake

in ditch

stake

ditch

stake

ditch

Sta	B.S.	H.I.	F.S.	EL.
5+0			4.3	95.7
			6.8	93.2
6+0			3.8	96.2
			7.5	92.5
7+0			3.5	96.5
			7.5	92.5
⊙	3.87	100.32	3.55	96.45
8+0			3.6	96.4
			8.3	92.0
9+0			2.8	98.1
			8.2	92.1
10+0			3.1	97.2
			8.5	91.8
11+0			4.0	96.3
			8.5	91.8
12+0			4.5	95.8
			8.7	91.6
⊙	5.15	101.43	4.04	96.28
13+0			5.1	96.3
			10.0	91.4

Sta	B.S.	H.I.	F.S.	EL.
14+0			3.4	98.0
			9.8	91.6
15+0			3.9	97.5
			10.4	91.0
16+0			3.4	98.0
			10.1	91.3
⊙	3.27	101.35	3.35	98.08
17+0			4.0	97.4
			10.4	91.0
18+0			5.3	96.1
			10.2	91.2
19+0			3.9	97.5
			10.5	91.1
20+0			2.4	99.0
			11.2	90.2
21+0			3.0	98.4
			11.4	90.0
22+0			3.0	98.4
			11.4	90.0

101.43
3.35
98.08
3.27
1.35

Sta.	B.S.	H.I.	F.S.	El.
⊙	1.42	100.14	2.63	98.72
23+0			1.4	98.7
			10.8	89.3
24+0			2.6	97.5
			11.0	89.1
25+0			3.5	96.6
			11.4	88.7
26+0			6.3	93.8
			11.5	88.8
⊙	5.90	99.78	6.26	93.88
27+0			4.5	95.3
			11.9	87.9
28+0			4.4	95.4
			12.2	87.6
29+0			5.0	94.8
			12.3	87.5
29+50			12.50	87.28
B.M.#2			3.20	96.58
29+59				

S. end of concrete floor of bridge top SE cor of S handrail bridge. ℄ E+W gravel road. Water 0.8' deep.

101.35
2.63
98.72
1.42
100.14
6.26
93.88
5.90
99.78
12.50
87.28

91.14
87.28
3.86

Sta.	B.S.	H.I.	F.S.	
	2.97			102.97
			5.23	8.20
				94.77
		11.17		
		8.50		
		2.67		

Check Levels

School ground grading - Danville Ind

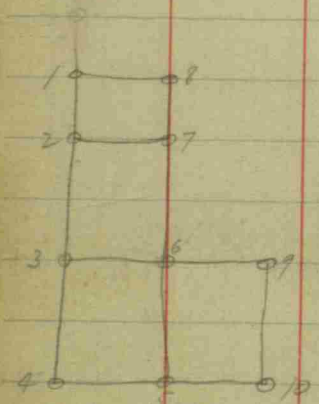
16th June 1947

Franklin - Shartle - Claypool

Sta	B.S.	H.I.	F.S.	Present EL	Proposed EL	
B.M.#6	0.83	896.32		895.49		
J5			3.42	892.90	894.0	F 1.1
I5			2.26	894.06	894.5	F 0.44
H5			2.40	893.92	894.7	F 0.78
G5			2.60	893.72	894.6	F 0.88
F5			2.70	893.62	894.3	F 0.68
G6			3.93	892.39	893.7	F 1.31
H6			4.24	892.08	893.7	F 1.62
I6			4.65	891.67	893.5	F 1.83
J6			4.70	891.62	893.0	F 1.38
J7			8.25	888.07	892.0	F 3.93
I7			7.50	888.82	892.5	F 3.68
H7			7.70	888.62	892.7	F 4.08
G7			5.35	890.97	892.7	F 1.73
I8			7.40	888.92	891.5	F 2.58

Sta.	B.S.	H.I.	F.S.	Present EL.	Proposed EL.	
J8			8.45	887.87	891.0	F 3.13
H9			4.30	892.02	892.5	F 0.48
I10			5.10	891.22	890.6	C 0.62
J10			4.60	891.72	891.5	C 0.22
J11			3.60	892.72	892.5	C 0.22
B.M.#3	0.98	916.41		915.43		
M17			4.40	912.01	911.3	C 0.71
M16			5.57	910.84	908.5	C 2.34
M15			6.94	909.47	907.5	C 1.97
L15			6.35	910.06	908.5	C 1.56
N15			5.90	910.51	910.6	F 0.09
N14			8.32	908.09	----	---
M14			8.30	908.11	906.5	C 1.61
L14			8.63	907.78	907.5	C 0.28
J14			7.65	908.76	----	---
L13			11.70	904.71	----	---
M13			12.10	904.31	905.5	F 1.19
N13			10.33	906.08	----	---

North Salem School playground
29 June 1947
Franklin
Shartle



Sta	B.S.	H.I.	Stake F.S.	Ground F.S.	Elev. stake	Elev ground	Proposed ground	cut or fill stake	cut or fill ground
6		100.20	5.16	6.08	94.84	93.92	94.00	C 0.84	F 0.08
4			2.82	3.76	97.18	96.24	95.00	C 2.18	C 1.24
3			2.57	4.21	96.43	95.79	95.00	C 1.43	C 0.79
2			2.72	3.44	97.28	96.56	95.00	C 2.28	C 1.56
1			2.20	2.84	97.80	97.16	95.00	C 2.80	C 2.16
8			3.94	4.75	96.06	95.25	94.00	C 2.06	C 1.25
7			4.87	5.62	95.13	94.38	94.00	C 1.13	C 0.38
5			4.62	5.56	95.38	94.44	94.00	C 1.38	C 0.44
10			6.76	7.65	93.24	92.35	93.00	C 0.24	F 0.65
9			7.20	7.81	92.80	92.19	93.00	F 0.20	F 0.81

HARVEY GENTRY DITCH

Sta.	B.S.	H.I.	Ditch F.S.	Elev.
0+0 B.M. Bottom of tile at headwall	6.85	100.00		93.15
-2-0			6.8	93.2
-4-0			7.2	92.8
-6-0			8.0	92.0
-8-0			8.2	91.8
-10-50			8.25	91.75
			on stake	Elev
0+0	8.81	101.96		93.15
1			1.98	99.98
2			0.61	101.35
3			1.53	100.43
4	7.25	107.17	2.04	99.92

July 5, 1947

Major Franklin - rod
Stanley Shattle - level
Offie Claypool - chain
"Shorty" Pearcy - chain

3560 cu yds estimated

Elev of B.M. = 93.15

93.15
91.75
1.40

101.96
.61
101.35

101.96
1.53
100.43

93.15
8.81
101.96
1.98
99.98
101.96
2.04
99.92
7.25
7.17

on tile at headwall

Sta	B.S.	H.I.	F.S.	EL.
5			6.62	100.55
6			6.49	100.68
7			6.90	100.27
8			5.78	101.39
9			4.60	102.57
10			4.40	102.77
11			5.40	101.77
12			6.00	101.17
13			6.70	100.47
14			7.40	99.77
15	4.63	104.53	7.27	99.90
16			4.70	99.83
17			4.70	99.83
18			4.10	100.43
19			4.20	100.33
20+10			7.40	97.13

12" tile (bottom)

107.17
6.62
100.55

107.17
6.49
100.68

107.17
7.27
99.90

4.63
104.53

107.17
6.90
100.27

107.17
6.70
100.47

104.53
4.70
99.83

104.53
4.10
100.43

104.53
7.2
771 3
9315

107.17
5.78
101.39

107.17
4.60
102.57

107.17
4.40
102.77

107.17
5.40
101.77

107.17
6
101.17

107.17
7.40
99.77

107.17
4.10
103.07

Pickerell Channel Change

cloudy - warm

B.M. - G.E. Co. July 10 - 1947
found. furnace Franklin Channel at 1+00 - 7.2 Elev 92.98'
El 100 Claypool 0+00 same section as 1+00

Sta	BS	FS	HI	Top Stake	Gd Stake	15 N. 15'S	℄ 30'S	15'S. 45'S	El.
	0.18								
1+00			100.18	99.70 0.48	99.98 0.20	97.68 2.5	97.68 Do	97.68 Do	
2+00				96.98 3.2	96.28 3.9	97.68 2.5	97.48 2.7	96.68 3.5	
3+00				95.68 4.5	94.88 5.3	91.18 9.0	93.08 7.1	93.18 7.0	
4+00				96.68 3.5	95.98 4.2	95.58 4.6	93.46 6.1	95.18 5.0	
5+00				94.68 5.5	93.78 6.4	93.28 6.9	93.88 6.3	92.88 7.3	
5+33					90.18 10.0	90.18 same	90.18 Do	90.18 Do	
6+33					90.18 [illegible]	90.18	90.18	90.18	

Curve Information

P.C. - 1+00 PT - 6+33

I = 64° - R = 476

L = 533' T = 300'

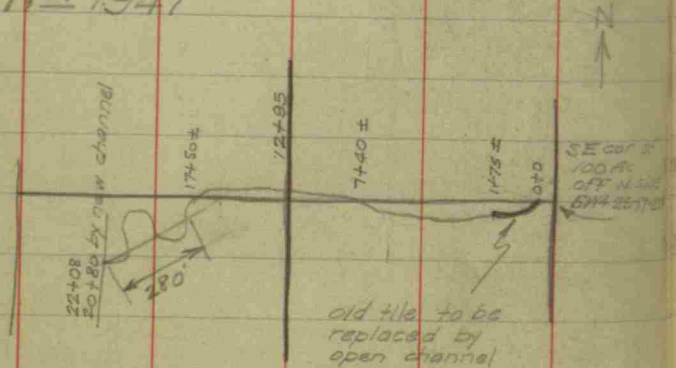
D = 12°

Reference stake 100' W of P.I.

Levels on Thos. R. Leak Ditch

R. M. Franklin - level
Stanley Shantle - notes
Jim Gossett - rod

14th Nov 1947



Sta.	B.S.	H.I.	stake F.S.	ditch F.S.	Elev.
B.M.	9.87	100.00			90.13
					94.05
0			5.95	7.2	92.8
					95.95
1			4.05	8.0	92.0
					95.10
2			4.90	9.5	90.5
					92.65
3			7.35	10.5	89.5
					91.52
4			8.48	10.8	89.2
					92.60
5			7.40	11.0	89.0
					91.70
6			8.30	11.2	88.8
					90.48
7	on stake 5.57	96.05	9.52	11.7	88.3
					90.95
8			5.10	8.1	87.95
					90.05
9			6.00	8.2	87.85
					89.70
10			6.35	8.3	87.75
					89.23
11			6.82	8.4	87.65
					88.70
12			7.35	8.6	87.45
					90.55
13			5.50	9.1	86.95
					89.28
14			6.77	10.2	85.85
					88.50
15			7.55	10.7	85.35
					87.80
16	on stake 4.62	92.42	8.25	10.7	85.35
					89.31
17			3.11	7.2	85.22

18		5.77	7.3	86.45 / 85.12
19		6.58	8.0	85.84 / 84.42
20			8.2	84.22
21			8.7	83.72
22+08			9.3	83.12

Grade = $-\frac{5.01}{2080} = -0.24\%$

90.13 / 83.12 / 7.01

92.42 / 7.3 / 5.12

92.42 / 9.3 / 83.12

90.13 / 84.42 / 5.71

2 / 19.37 / 31

Sta.	Elev. proposed	cut below pres. ditch	cut below grade stake	End Area	(cu. yds.) Volume
0	88.13	2.00	5.92	7	
1	87.89	4.11	8.06	14	39
1+75				14	39
2	87.65	2.85	7.45	10	11
3	87.41	2.09	5.24	7	32
4	87.17	2.03	4.35	7	26
5	86.93	2.07	5.67	7	26
6	86.69	2.11	5.01	7	26
7	86.45	1.85	4.03	7	26
8	86.21	1.74	4.74	6	24
9	85.97	1.88	4.08	7	24
10	85.73	2.02	3.97	7	26
11	85.49	2.16	3.74	7	26
12	85.25	2.20	3.45	8	28
13	85.01	1.94	5.54	7	28
14	84.77	1.08	4.51	4	20

15	84.53	0.82	3.97	3	13
16	84.29	1.06	3.51	4	13
17	84.05	1.17	5.26	4	15
18	83.81	1.31	2.84	5	17
18+25				11	7
19	83.57	3.00	2.27	11	31
20	83.33	3.00		11	41
20+50	83.14	0		0	16
	Est. cu. yds. excavation =				554

Tharp Drain

Jan 23, 1948 Major Franklin
J. Gossett
B. Harvey

	B.S	F.S	H.I	El.
	10.00		110.00	100.00
		10.50		99.50
T.P.	5.85	5.1	110.75	104.90
	10.92	11.60	110.07	99.15
		12.5		97.57

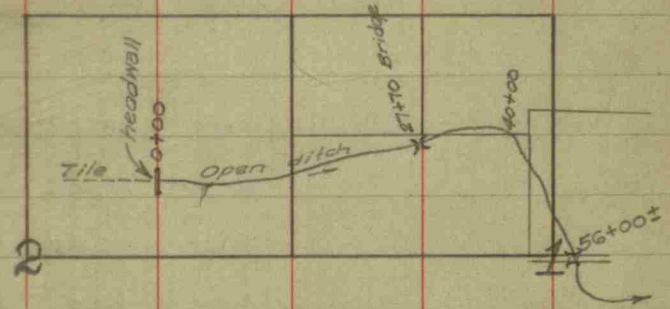
Main Tile 14" Tile
Arm = 1 10" tile

Water level N.-Side Rail Road.
1.65' from water level to top of pipe. 6' pipe.
0.7' fall in pipe.

End of Tharp Drain Flow line

WILLIAMS & HILL DRAIN
SEC. 192-16-1W

R. Major Franklin
Stanley Shartle
April 17, 1948. Jim Gossett



Sta.	B.S.	H.I.	Top Stake F.S.	Ditch F.S.	Elev. Stake	Elev. Ditch
B.M. #1		100.00	7.40			
0				12.40	—	87.60
1			2.00	8.90	98.00	91.10
2			2.50	9.40	97.50	90.60
3			2.40	10.00	97.60	90.00
4			2.50	10.30	97.50	89.70
5			3.40	10.50	96.60	89.50
6			2.30	10.60	97.70	89.40
7			2.20	10.50	97.80	89.50
8			2.70	10.60	97.30	89.40
9			4.10	11.30	95.90	88.70
10			2.50	11.30	97.50	88.70
11			4.20	11.20	95.80	88.80
12			4.60	11.30	95.40	88.70

Top of ℄ of howl. 92.60'

~~Top of tile~~

Survey to determine outs for proposed private cleanout of part of open section of Williams & Hill Drain.

Sta.	B.S.	H.I.	Stake F.S.	Ditch F.S.	Elev. Stake	Elev. Ditch
⊙	3.57	98.95	4.62		95.38	
13			2.70	10.00	96.25	88.95
14			3.90	10.00	95.05	88.95
15			3.40	10.40	95.55	88.55
16			3.00	10.20	95.95	88.75
17			3.40	10.00	95.55	88.95
18			3.40	10.60	95.55	88.35
19			3.20	10.20	95.75	88.75
20			2.50	10.40	96.45	88.55
21			3.00	10.20	95.95	88.75
22			3.20	10.40	95.75	88.55
⊙	3.63	99.77	2.81		96.14	
23			3.60	11.00	96.17	88.77
24			4.90	11.20	94.87	88.57
25			4.00	11.60	95.77	88.17
26			4.10	11.20	95.67	88.57
07			5.60	11.30	94.17	88.47
B.M. #2			6.22		93.55	
28			5.10	12.00	94.67	87.77

April 19, 1948
Stanley Shartle - R
Jim Gossett - rod

on end of NW wing conc. bridge 27+70

95.38
3.57
98.95
2.81
96.14
3.63
99.77

Sta.	B.S.	H.I.	Stake F.S.	Ditch F.S.	Elev. Stake	Elev. Ditch
29			3.60	11.70	96.11	88.07
30			4.50	12.00	95.21	87.77
31			4.30	12.40	95.41	87.37
32			4.90	12.30	94.81	87.47
33			5.40	12.20	94.31	87.57
⊙	4.07	97.84	6.00		93.77	
34			2.70	10.80	95.14	87.04
35			2.90	10.50	94.94	87.34
36			3.50	10.30	94.34	87.54
37			5.20	11.00	92.64	86.84
38			4.10	10.60	93.74	87.24
39			3.90	10.90	93.94	86.94
40			3.90	11.10	93.94	86.74
41			2.90	11.00	94.94	86.84
⊙	3.98	97.91	3.91		93.93	
42			4.00	11.20	93.91	86.71
43			3.80	11.30	94.11	86.61
44			4.00	11.50	93.91	86.41
45			2.90	12.40	95.01	85.51

97.84
3.41
93.93
3.98
97.91

Sta.	B.S.	H.I.	Stake F.S.	Ditch F.S.	Elev. Stake	Elev. Ditch
46			10.00	12.50	87.91	85.41
⊙	1.42	95.81	3.52		94.39	
47			1.40	11.20	94.41	84.61
48			2.00	11.00	93.81	84.81
49			2.30	12.20	93.51	83.61
50			3.50	11.50	92.31	84.31
51			3.00	11.80	92.81	84.01
52			3.70	11.80	92.11	84.01
⊙	2.07	94.55	3.33		92.48	
53			2.35	10.70	92.20	83.85
54				11.00		83.55
55				11.10		83.45
56 ±				11.60		82.95
B.M.#3			5.11		89.44	

87.60
84.31
3.29

97.91
3.52
94.39
1.42
95.81
3.33
92.48
2.07
84.55

Ditch at road bridge

On N. end E. abutment of bridge

Levels on J. L. Durham Farm
S½ 22-17-21W

14 May 1943 — Stanley Shartle
Jim Gossett
John Selck

+0.2% Grade proposed

Sta.	B.S.	H.I.	F.S.	EL.	Cut
0+0 Flowline	8.06	108.06		100.00	0
Bottom of N. edge pond			9.50	98.56	—
5+0 Ground			3.35	104.71	3.71
5+0 Stake	6.68	111.66	3.08	104.98	3.98
10+0 Ground			5.05	106.61	4.61
10+0 Stake			4.73	106.93	4.93
11+58	N & S fence				—
15+0 Ground			4.80	106.86	3.86
15+0 Stake	5.52	112.75	4.43	107.23	4.23
18+0 Pond			5.75	107.00	3.40
18+50 Pond			6.00	106.75	3.05
20+0 Ground			5.40	107.35	3.35
20+0 Stake			4.87	107.88	3.88
23+91 Ground			4.08	108.67	3.89
23+91 Stake			3.78	108.97	4.21

112.75 − 5.40 = 107.35
112.75 − 4.87 = 107.88
112.75 − 4.08 = 108.67
112.75 − 3.78 = 108.97
18.50 − 3.700 = 14.80

108.06 − 3.35 = 104.71
108.06 − 3.08 = 104.98
111.66 − 5.05 = 106.61
111.66 − 4.73 = 106.93
111.66 − 4.80 = 106.86
112.75 − 5.52 = 107.23
112.75 − 5.75 = 107.00
106.75 − 101.85 = 4.90

111.66 − 4.73 = 106.93
111.66 − 4.80 = 106.86
106.75 − 103.70 = 3.05

water 0.6' deep
" 0.85' deep
@ N & S fence

Walter Bullion Drain

Cause No. 17888

June 11, 1948   R. M. Franklin

Stanley Shartle

Jim Gossett

John Selch

Following traverse is run 20' W. of proposed ℄.

offset 0+00 is 21' W of fence cor. and 587' W of Stone Cen. S. NE1/4 33-16-2W

thence N 14°E by compass.

thence N16°05'E corrected

7+96.9	P.C.	Δ = 28°23' Rt.
		D = 5°00'
10+86.7	P.I.	L = 567.67'
		T = 289.80
13+64.57	P.T.	R = 1146
		E = 36.07'

Sta	Defl.
8+00	0°04'30"
9+00	2°34'30"
10+00	5°04'30"
11+00	7°34'30"
12+00	10°04'30"
13+00	12°34'30"
13+64.57	14°11'30"

Δ = 28°23' = 28.38333 Rt.

D = 5°

L = 567.67'

T = 289.80'

R = 1146'

E = 36.07'

$L = 100 \frac{\Delta}{D} = L$

$\frac{\Delta}{D} = \frac{L}{100}$

796.9
289.8
1086.7

796.9
567.67
1364.57

5 | 28.38333
5.676

5 | 5736
1146

6 | 28°23'
4°

2 | 21°23'
14°11.5

.24517

24517 | 5000000.

4362 | 5000000.

offset P.I. Oak 24" N W 121.5'

offset P.T. Cor. Stone N E 88.8'

64.6

.646
2.5
3230
1292
16150

25288
1146
151728
101152
25288
25288
28980048

1237
12 34 30
14 11 30

615
60
36900

14+63.3	offset passes 3.9' NW from stone	
24+51.86	P.C.	Ash 18" S W 71.5'
28+45.10	P.I.	
32+19.36	P.T.	

Sta	Defl.
25+00	0°58'
26+00	2°58'
27+00	4°58'
28+00	6°58'
29+00	8°58'
30+00	10°58'
31+00	12°58'
32+00	14°58'
32+19.36	15°21'

Δ = 30°42' Lt.
D = 4°00'
L = 767.50
T = 393.24
R = 1432.5'

From 32+19.36 (P.T.) forward needle bearing = N12°E. (Actually N13°46'E)

31+66.7 ℄ E & W Road 271 ft west of NE cor Sec. 33, T15N, R2W.

Δ = 30°42' Lt
D = 4°00'
L = 767.50
R = 1432.5'
T = 393.24

60 | 42.0 = .7

4 | 30.700 = 7.675

4 | 5730 = 1432.5

.27451

2845.10
− 393.24
2451.86
+ 767.50
3219.36

40+09.7	P.C.	
42+15.98	P.I.	
44+11.37	P.T.	
	Sta	Defl.
	41+00	3°37'
	42+00	7°37'
	43+00	11°37'
	44+00	15°37'
	44+11.37	16°04'
53+00	top of bank	
53+11	edge water	
53+19	℄ stream	

Δ = 32°08' Rt
D = 8°
L = 401.67'
T = 206.28'
R = 716.25'

41+85 offset line crosses N+S fence

Δ = 32°08' Rt
D = 8°00'
L = 401.67'
R = 716.25'
T = 206.28'

60) 8.0 = .1333

8) 32.13333 = 4.01667

8) 5730.00 = 716.25

40+09.7
4+01.67
44+11.37

716.25
.288
206.28000

40+09.7
206.28
42+15.98

.903 × 4 = 3.612
612 × 60 = 36720
.1137 × 8 = .4548
27.288

Sta.	B.S.	H.I.	Stake F.S.	Ground F.S.	Elev Stake	Elev Ground	
B.M.#1	1.00	100			99.00	117 E & 93.5' N of 0+00 (offset). Top of stone.	100.00 − 7.57 = 92.43 + 1.99 = 94.42 − 5.19 = 89.23
0+00			1.70	1.35	98.30	98.65	
0+30±				3.10		96.90	
1+00			1.65	2.40	98.35	97.60	94.42 − 5.68 = 88.74 − 3.29 = 92.03
2+00			2.11	2.95	97.89	97.05	
3+00			3.00	3.80	97.00	96.20	
4+00			3.50	4.50	96.50	95.50	
5+00			4.45	5.00	95.55	95.00	
6+00			4.75	5.20	95.25	94.80	
7+00			5.50	6.35	94.50	93.65	
8+00			6.30	6.95	93.70	93.05	
9+00			6.70	7.45	93.30	92.55	
10+00 T.P.	1.99	94.42	7.57	2.65	92.43	91.77	
11+00			1.75	2.40	92.67	92.02	
12+00			3.35	4.05	91.07	90.37	
13+00			4.00	4.80	90.42	89.62	
14+00			4.70	5.25	89.72	89.17	
14+63.3 B.M.#2			5.19		89.23	3.9' to Right of 14+63.3 (offset) top of stone.	
15+00			4.80	5.30	89.62	89.12	

Sta.	B.S.	H.I. 94.42	Stake F.S.	Ground F.S.	Elev. Stake	Elev. Ground
16+00			4.60	5.55	89.82	88.72
17+00			6.10	6.70	88.32	87.72
18+00			6.95	7.45	87.47	86.97
T.P. 19+00	3.29	92.03	5.68	3.80	88.74	88.23
20+00			2.80	3.65	89.23	88.38
21+00			4.50	5.30	87.53	86.73
22+00			3.00	3.75	89.03	88.28
23+00			5.08	5.10	86.95	86.93
24+00			5.76	5.80	86.27	86.13
25+00			6.21	6.85	85.82	85.18
26+00 T.P.			7.47	8.05	84.56	83.98
27+00	2.97	89.29	5.71	6.50	83.58	82.79
28+00			4.20	5.15	85.09	84.14
29+00			3.95	4.80	85.34	84.49
30+00			3.90	1.80	85.39	84.49
31+00			4.15	5.00	85.14	84.29
B.M.#3			7.48		81.81	
			10.27		79.02	
BM#1			4.05		85.24	

92.03
- 5.24
86.39
+ 2.97
89.29
- 7.68
81.61
+ 1.03
82.64

Top stone 26'± S. of NE cor 33-16-2W
~~Top boulder 10'± S of Fence@culvert~~
℄ of culvert S. end.
Top. con. cor. post N. side of Rd.

Sta.	B.S.	H.I. 89.29	Sta. F.S.	Ground F.S.	Elev Sta.	Elev Ground					
31+66.7			4.50			84.79			E of Rd.		
32+00			5.10	5.70	84.19	83.59					
33+00			5.15	6.30	84.14	82.99					
34+00			6.25	6.95	83.04	82.34					81.61 + 1.03 = 82.64
35+00			6.65	7.75	82.64	81.54					7.09
TP 36+00	1.03	82.64	7.68	2.05	81.61	80.59					75.55 + 2.43 = 77.98
37+00			2.80	3.95	79.84	78.89					
38+00			6.45	8.10	76.19	74.54	Ground shot is bottom of gully				
39+00			4.80	4.85	77.84	77.79					
40+00			6.50	7.05	76.14	75.59					
				8.10		74.54	Ground shot 60' R of Sta. 40+00				
41+00			8.85	9.50	73.79	73.14					
42+00			8.30	9.25	74.34	73.39					
T.P.	2.43	77.98	7.09		75.55						
43+00			3.40	4.95	74.58	73.03					
44+00			4.20	5.80	73.78	72.18					
45+00			6.20	7.50	71.78	70.48					
46+00			3.75	5.80	74.23	72.18					
47+00			7.75	9.35	70.23	68.63					

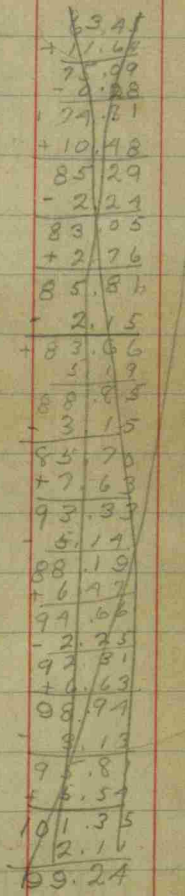
Sta	B.S.	H.I. 77.38	Stake FS	Ground FS	Elev. Stake	Elev Ground	
48+00 T.P.			9.20	10.45	68.78	67.53	
49+00	2.04	69.28	10.74	4.05	67.25	65.23	
				5.15		64.13	Shot in hog hole
50+00			0.20	4.45	69.08	64.83	
51+00			7.20	7.20	62.08	62.08	
52+00	1.26	65.39	8.15	5.55	61.19	59.84	
BM #5			2.25		63.14		Top of Rock 115± S. of Sta. 52+00
52+95				6.40		58.99	gully
53+00			5.00	5.55	60.39	59.84	
53+19				12.40		52.99	bottom of stream
	MDI						

Walter Bolton Drain

June 18, 1918 Jim Gossett
John Selch

The following is check on levels that were run from sta. 0+00 to sta 53+19. This circuit started BM #5 and goes to BM #1.

	B.S.	HI	F.S.	Elev	B.M. Elev.	difference
B.M #5	11.64	74.78		63.14		
	10.48	84.98	0.28	74.50		
	2.76	85.50	2.21	82.74		
BM #1			0.39	85.11	85.24	0.13
	5.19	88.54	2.15	83.35		
B.M. #3			6.81	81.73	81.81	0.08
	7.63	93.03	3.15	85.39		
	6.17	94.35	5.14	87.88		



	B.S.	H.I.	F.S.	Elev	B.M. Elev	Difference
B.M. #2		94.35	5.06	89.29	89.23	0.06
	6.63	98.73	2.25	92.10		
	5.54	101.14	3.13	95.60		
B.M. #1			2.11	99.03	99.[illegible]	0.03

Shot	B.S.	HI	FS	Elv.	
BM #1	4.72	100.00		95.28	Nail on S side of Tel. Pole on E side of road.
			6.95	93.05	40' E &
			7.30	92.70	100' E of E road fence 200' S of N road fence
			6.90	93.10	100' E of E road fence 350' S of N road fence
			4.80	95.20	50' S of gate
T.P.	2.65	98.65	4.00	96.00	
			11.75	86.90	

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1¹/₄ TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

MADE IN GERMANY.
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