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## Products of arcs and sines of 15-degree rhumbs

Calhoun, Guy K.

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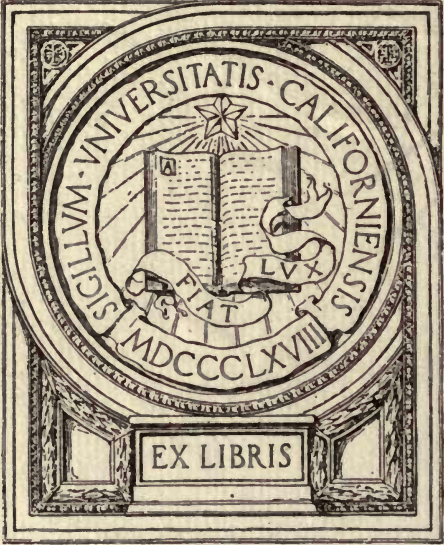
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WHEN 15-DEGREE RHUMBS ARE USED



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PRODUCTS OF  
ARCS AND SINES  
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FOR USE IN ANALYSIS OF DEVIATIONS  
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UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

**Products of Arcs and Sines of Rhumbs.**

Arcs	Sin 15° S <sub>1</sub>	Sin 30° S <sub>2</sub>	Sin 45° S <sub>3</sub>	Sin 60° S <sub>4</sub>	Sin 75° S <sub>5</sub>	Arcs	Sin 15° S <sub>1</sub>	Sin 30° S <sub>2</sub>	Sin 45° S <sub>3</sub>	Sin 60° S <sub>4</sub>	Sin 75° S <sub>5</sub>
0 5	0 1	0 3	0 4	0 4	0 5	4 25	I 9	2 13	3 7	3 49	4 16
0 10	0 3	0 5	0 7	0 9	0 10	4 30	I 10	2 15	3 11	3 54	4 21
0 15	0 4	0 8	0 11	0 13	0 14	4 35	I 11	2 18	3 14	3 58	4 26
0 20	0 5	0 10	0 14	0 17	0 19	4 40	I 12	2 20	3 18	4 2	4 30
0 25	0 6	0 13	0 18	0 22	0 24	4 45	I 14	2 23	3 22	4 7	4 35
0 30	0 8	0 15	0 21	0 26	0 29	4 50	I 15	2 25	3 25	4 11	4 40
0 35	0 9	0 18	0 25	0 30	0 34	4 55	I 16	2 28	3 29	4 15	4 45
0 40	0 10	0 20	0 28	0 35	0 39	5 0	I 18	2 30	3 32	4 20	4 50
0 45	0 12	0 23	0 32	0 39	0 43	5 5	I 19	2 33	3 36	4 24	4 55
0 50	0 13	0 25	0 35	0 43	0 48	5 10	I 20	2 35	3 39	4 28	4 59
0 55	0 14	0 28	0 39	0 48	0 53	5 15	I 22	2 38	3 43	4 33	5 4
1 0	0 16	0 30	0 42	0 52	0 58	5 20	I 23	2 40	3 46	4 37	5 9
1 5	0 17	0 33	0 46	0 56	I 3	5 25	I 24	2 43	3 50	4 41	5 14
1 10	0 18	0 35	0 49	I 1	I 8	5 30	I 25	2 45	3 53	4 46	5 19
1 15	0 19	0 38	0 53	I 5	I 12	5 35	I 27	2 48	3 57	4 50	5 24
1 20	0 21	0 40	0 57	I 9	I 17	5 40	I 28	2 50	4 0	4 54	5 28
1 25	0 22	0 43	I 0	I 14	I 22	5 45	I 29	2 53	4 4	4 59	5 33
1 30	0 23	0 45	I 4	I 18	I 27	5 50	I 31	2 55	4 7	5 3	5 38
1 35	0 25	0 48	I 7	I 22	I 32	5 55	I 32	2 58	4 11	5 7	5 43
1 40	0 26	0 50	I 11	I 27	I 37	6 0	I 33	3 0	4 15	5 12	5 48
1 45	0 27	0 53	I 14	I 31	I 41	6 5	I 34	3 3	4 18	5 16	5 53
1 50	0 28	0 55	I 18	I 35	I 46	6 10	I 36	3 5	4 22	5 20	5 57
1 55	0 30	0 58	I 21	I 40	I 51	6 15	I 37	3 8	4 25	5 25	6 2
2 0	0 31	I 0	I 25	I 44	I 56	6 20	I 38	3 10	4 29	5 29	6 7
2 5	0 32	I 3	I 28	I 48	2 1	6 25	I 40	3 13	4 32	5 33	6 12
2 10	0 34	I 5	I 32	I 53	2 6	6 30	I 41	3 15	4 36	5 38	6 17
2 15	0 35	I 8	I 35	I 57	2 10	6 35	I 42	3 18	4 39	5 42	6 22
2 20	0 36	I 10	I 39	2 1	2 15	6 40	I 44	3 20	4 43	5 46	6 26
2 25	0 38	I 13	I 43	2 6	2 20	6 45	I 45	3 23	4 46	5 51	6 31
2 30	0 39	I 15	I 46	2 10	2 25	6 50	I 46	3 25	4 50	5 55	6 36
2 35	0 40	I 18	I 50	2 14	2 30	6 55	I 47	3 28	4 53	5 59	6 41
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2 45	0 43	I 23	I 57	2 23	2 39	7 5	I 50	3 33	5 1	6 8	6 51
2 50	0 44	I 25	2 0	2 27	2 44	7 10	I 51	3 35	5 4	6 12	6 55
2 55	0 45	I 28	2 4	2 32	2 49	7 15	I 53	3 38	5 8	6 17	7 0
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3 35	0 56	I 48	2 32	3 6	3 28	7 55	2 3	3 58	5 36	6 51	7 39
3 40	0 57	I 50	2 36	3 11	3 33	8 0	2 4	4 0	5 39	6 56	7 44
3 45	0 58	I 53	2 39	3 15	3 37	8 5	2 6	4 3	5 43	7 0	7 48
3 50	I 0	I 55	2 43	3 19	3 42	8 10	2 7	4 5	5 46	7 4	7 53
3 55	I 1	I 58	2 46	3 24	3 47	8 15	2 8	4 8	5 50	7 9	7 58
4 0	I 2	2 0	2 50	3 28	3 52	8 20	2 9	4 10	5 54	7 13	8 3
4 5	I 3	2 3	2 53	3 32	3 57	8 25	2 11	4 13	5 57	7 17	8 8
4 10	I 5	2 5	2 57	3 37	4 1	8 30	2 12	4 15	6 1	7 22	8 13
4 15	I 6	2 8	3 0	3 41	4 6	8 35	2 13	4 18	6 4	7 26	8 17
4 20	I 7	2 10	3 4	3 45	4 11	8 40	2 15	4 20	6 8	7 30	8 22



## Products of Arcs and Sines of Rhumbs.

Arcs	Sin	Sin	Sin	Sin	Sin	Arcs	Sin	Sin	Sin	Sin	Sin
	15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>		15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>
8 45	2 16	4 23	6 11	7 35	8 27	13 5	3 23	6 33	9 15	11 20	12 38
8 50	2 17	4 25	6 15	7 39	8 32	13 10	3 24	6 35	9 19	11 24	12 43
8 55	2 18	4 28	6 18	7 43	8 37	13 15	3 26	6 38	9 22	11 28	12 48
9 0	2 20	4 30	6 22	7 48	8 42	13 20	3 27	6 40	9 26	11 33	12 53
9 5	2 21	4 33	6 25	7 52	8 46	13 25	3 28	6 43	9 29	11 37	12 58
9 10	2 22	4 35	6 29	7 56	8 51	13 30	3 30	6 45	9 33	11 41	13 2
9 15	2 24	4 38	6 32	8 1	8 56	13 35	3 31	6 48	9 36	11 46	13 7
9 20	2 25	4 40	6 36	8 5	9 1	13 40	3 32	6 50	9 40	11 50	13 12
9 25	2 26	4 43	6 40	8 9	9 6	13 45	3 34	6 53	9 43	11 54	13 17
9 30	2 28	4 45	6 43	8 14	9 11	13 50	3 35	6 55	9 47	11 59	13 22
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9 40	2 30	4 50	6 50	8 22	9 20	14 0	3 37	7 0	9 54	12 7	13 31
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12 55	3 21	6 28	9 8	11 11	12 29	17 15	4 28	8 38	12 12	14 56	16 40
13 0	3 22	6 30	9 12	11 16	12 33	17 20	4 29	8 40	12 15	15 1	16 45

## Products of Arcs and Sines of Rhumbs.

Arcs	Sin	Sin	Sin	Sin	Sin	Arcs	Sin	Sin	Sin	Sin	Sin
	15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>		15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>
17 25	4 30	8 43	12 19	15 5	16 49	21 45	5 38	10 53	15 23	18 50	21 1
17 30	4 32	8 45	12 22	15 9	16 54	21 50	5 39	10 55	15 26	18 54	21 5
17 35	4 33	8 48	12 26	15 14	16 59	21 55	5 40	10 58	15 30	18 59	21 10
17 40	4 34	8 50	12 30	15 18	17 4	22 0	5 42	11 0	15 33	19 3	21 15
17 45	4 36	8 53	12 33	15 22	17 9	22 5	5 43	11 3	15 37	19 7	21 20
17 50	4 37	8 55	12 37	15 27	17 14	22 10	5 44	11 5	15 40	19 12	21 25
17 55	4 38	8 58	12 40	15 31	17 18	22 15	5 46	11 8	15 44	19 16	21 30
18 0	4 40	9 0	12 44	15 35	17 23	22 20	5 47	11 10	15 48	19 20	21 34
18 5	4 41	9 3	12 47	15 40	17 28	22 25	5 48	11 13	15 51	19 25	21 39
18 10	4 42	9 5	12 51	15 44	17 33	22 30	5 49	11 15	15 55	19 29	21 44
18 15	4 43	9 8	12 54	15 48	17 38	22 35	5 51	11 18	15 58	19 33	21 49
18 20	4 45	9 10	12 58	15 53	17 43	22 40	5 52	11 20	16 2	19 38	21 54
18 25	4 46	9 13	13 1	15 57	17 47	22 45	5 53	11 23	16 5	19 42	21 58
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19 5	4 56	9 33	13 30	16 32	18 26	23 25	6 4	11 43	16 33	20 17	22 37
19 10	4 58	9 35	13 33	16 36	18 31	23 30	6 5	11 45	16 37	20 21	22 42
19 15	4 59	9 38	13 37	16 40	18 36	23 35	6 6	11 48	16 41	20 25	22 47
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19 40	5 5	9 50	13 54	17 2	19 0	24 0	6 13	12 0	16 58	20 47	23 11
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19 50	5 8	9 55	14 1	17 11	19 9	24 10	6 15	12 5	17 5	20 56	23 21
19 55	5 9	9 58	14 5	17 15	19 14	24 15	6 17	12 8	17 9	21 0	23 25
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20 40	5 21	10 20	14 37	17 54	19 58	25 0	6 28	12 30	17 41	21 39	24 9
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20 55	5 25	10 28	14 47	18 7	20 12	25 15	6 32	12 38	17 51	21 52	24 23
21 0	5 26	10 30	14 51	18 11	20 17	25 20	6 33	12 40	17 55	21 56	24 28
21 5	5 27	10 33	14 54	18 16	20 22	25 25	6 35	12 43	17 58	22 1	24 33
21 10	5 29	10 35	14 58	18 20	20 27	25 30	6 36	12 45	18 2	22 5	24 38
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21 25	5 33	10 43	15 9	18 33	20 41	25 45	6 40	12 53	18 12	22 18	24 52
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21 35	5 35	10 48	15 16	18 42	20 51	25 55	6 42	12 58	18 20	22 27	25 2
21 40	5 36	10 50	15 19	18 46	20 56	26 0	6 44	13 0	18 23	22 31	25 7

## Products of Arcs and Sines of Rhumbs.

Arcs	Sin	Sin	Sin	Sin	Sin	Arcs	Sin	Sin	Sin	Sin	Sin
	15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>		15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>
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26 10	6 46	13 5	18 30	22 40	25 17	30 30	7 54	15 15	21 34	26 25	29 28
26 15	6 48	13 8	18 34	22 44	25 21	30 35	7 55	15 18	21 38	26 29	29 32
26 20	6 49	13 10	18 37	22 48	25 26	30 40	7 56	15 20	21 41	26 33	29 37
26 25	6 50	13 13	18 41	22 53	25 31	30 45	7 58	15 23	21 45	26 38	29 42
26 30	6 52	13 15	18 44	22 57	25 36	30 50	7 59	15 25	21 48	26 42	29 47
26 35	6 53	13 18	18 48	23 1	25 41	30 55	8 0	15 28	21 52	26 46	29 52
26 40	6 54	13 20	18 51	23 6	25 45	31 0	8 1	15 30	21 55	26 51	29 57
26 45	6 55	13 23	18 55	23 10	25 50	31 5	8 3	15 33	21 59	26 55	30 1
26 50	6 57	13 25	18 58	23 14	25 55	31 10	8 4	15 35	22 2	26 59	30 6
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28 20	7 20	14 10	20 2	24 32	27 22	32 40	8 27	16 20	23 6	28 17	31 33
28 25	7 21	14 13	20 6	24 37	27 27	32 45	8 29	16 23	23 9	28 22	31 38
28 30	7 23	14 15	20 9	24 41	27 32	32 50	8 30	16 25	23 13	28 26	31 43
28 35	7 24	14 18	20 13	24 45	27 37	32 55	8 31	16 28	23 17	28 30	31 48
28 40	7 25	14 20	20 16	24 50	27 41	33 0	8 32	16 30	23 20	28 35	31 53
28 45	7 26	14 23	20 20	24 54	27 46	33 5	8 34	16 33	23 24	28 39	31 57
28 50	7 28	14 25	20 23	24 58	27 51	33 10	8 35	16 35	23 27	28 43	32 2
28 55	7 29	14 28	20 27	25 3	27 56	33 15	8 36	16 38	23 31	28 48	32 7
29 0	7 30	14 30	20 30	25 7	28 1	33 20	8 38	16 40	23 34	28 52	32 12
29 5	7 32	14 33	20 34	25 11	28 6	33 25	8 39	16 43	23 38	28 56	32 17
29 10	7 33	14 35	20 37	25 16	28 10	33 30	8 40	16 45	23 41	29 1	32 22
29 15	7 34	14 38	20 41	25 20	28 15	33 35	8 42	16 48	23 45	29 5	32 26
29 20	7 36	14 40	20 45	25 24	28 20	33 40	8 43	16 50	23 48	29 9	32 31
29 25	7 37	14 43	20 48	25 29	28 25	33 45	8 44	16 53	23 52	29 14	32 36
29 30	7 38	14 45	20 52	25 33	28 30	33 50	8 45	16 55	23 55	29 18	32 41
29 35	7 39	14 48	20 55	25 37	28 35	33 55	8 47	16 58	23 59	29 22	32 46
29 40	7 41	14 50	20 59	25 42	28 39	34 0	8 48	17 0	24 3	29 27	32 50
29 45	7 42	14 53	21 2	25 46	28 44	34 5	8 49	17 3	24 6	29 31	32 55
29 50	7 43	14 55	21 6	25 50	28 49	34 10	8 51	17 5	24 10	29 35	33 0
29 55	7 45	14 58	21 9	25 55	28 54	34 15	8 52	17 8	24 13	29 40	33 5
30 0	7 46	15 0	21 13	25 59	28 59	34 20	8 53	17 10	24 17	29 44	33 10
30 5	7 47	15 3	21 16	26 3	29 3	34 25	8 54	17 13	24 20	29 48	33 15
30 10	7 48	15 5	21 20	26 8	29 8	34 30	8 56	17 15	24 24	29 53	33 19
30 15	7 50	15 8	21 23	26 12	29 13	34 35	8 57	17 18	24 27	29 57	33 24
30 20	7 51	15 10	21 27	26 16	29 18	34 40	8 58	17 20	24 31	30 1	33 29

## Products of Arcs and Sines of Rhumbs.

Arcs	Sin	Sin	Sin	Sin	Sin	Arcs	Sin	Sin	Sin	Sin	Sin
	15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>		15° S <sub>1</sub>	30° S <sub>2</sub>	45° S <sub>3</sub>	60° S <sub>4</sub>	75° S <sub>5</sub>
34 45	9 0	17 23	24 34	30 6	33 34	39 5	10 7	19 33	27 38	33 51	37 45
34 50	9 1	17 25	24 38	30 10	33 39	39 10	10 8	19 35	27 42	33 55	37 50
34 55	9 2	17 28	24 41	30 14	33 44	39 15	10 10	19 38	27 45	34 0	37 55
35 0	9 4	17 30	24 45	30 19	33 48	39 20	10 11	19 40	27 49	34 4	38 0
35 5	9 5	17 33	24 48	30 23	33 53	39 25	10 12	19 43	27 52	34 8	38 4
35 10	9 6	17 35	24 52	30 27	33 58	39 30	10 13	19 45	27 56	34 12	38 9
35 15	9 7	17 38	24 56	30 32	34 3	39 35	10 15	19 48	27 59	34 17	38 14
35 20	9 9	17 40	24 59	30 36	34 8	39 40	10 16	19 50	28 3	34 21	38 19
35 25	9 10	17 43	25 3	30 40	34 13	39 45	10 17	19 53	28 6	34 25	38 24
35 30	9 11	17 45	25 6	30 45	34 17	39 50	10 19	19 55	28 10	34 30	38 29
35 35	9 13	17 48	25 10	30 49	34 22	39 55	10 20	19 58	28 14	34 34	38 33
35 40	9 14	17 50	25 13	30 53	34 27	40 0	10 21	20 0	28 17	34 38	38 38
35 45	9 15	17 53	25 17	30 58	34 32	40 5	10 22	20 3	28 21	34 43	38 43
35 50	9 16	17 55	25 20	31 2	34 37	40 10	10 24	20 5	28 24	34 47	38 48
35 55	9 18	17 58	25 24	31 6	34 42	40 15	10 25	20 8	28 28	34 51	38 53
36 0	9 19	18 0	25 27	31 11	34 46	40 20	10 26	20 10	28 31	34 56	38 58
36 5	9 20	18 3	25 31	31 15	34 51	40 25	10 28	20 13	28 35	35 0	39 2
36 10	9 22	18 5	25 34	31 19	34 56	40 30	10 29	20 15	28 38	35 4	39 7
36 15	9 23	18 8	25 38	31 24	35 1	40 35	10 30	20 18	28 42	35 9	39 12
36 20	9 24	18 10	25 41	31 28	35 6	40 40	10 32	20 20	28 45	35 13	39 17
36 25	9 26	18 13	25 45	31 32	35 11	40 45	10 33	20 23	28 49	35 17	39 22
36 30	9 27	18 15	25 49	31 37	35 15	40 50	10 34	20 25	28 52	35 22	39 27
36 35	9 28	18 18	25 52	31 41	35 20	40 55	10 35	20 28	28 56	35 26	39 31
36 40	9 29	18 20	25 56	31 45	35 25	41 0	10 37	20 30	28 59	35 30	39 36
36 45	9 31	18 23	25 59	31 50	35 30	41 5	10 38	20 33	29 3	35 35	39 41
36 50	9 32	18 25	26 3	31 54	35 35	41 10	10 39	20 35	29 7	35 39	39 46
36 55	9 33	18 28	26 6	31 58	35 40	41 15	10 41	20 38	29 10	35 43	39 51
37 0	9 35	18 30	26 10	32 3	35 44	41 20	10 42	20 40	29 14	35 48	39 56
37 5	9 36	18 33	26 13	32 7	35 49	41 25	10 43	20 43	29 17	35 52	40 0
37 10	9 37	18 35	26 17	32 11	35 54	41 30	10 44	20 45	29 21	35 56	40 5
37 15	9 38	18 38	26 20	32 16	35 59	41 35	10 46	20 48	29 24	36 1	40 10
37 20	9 40	18 40	26 24	32 20	36 4	41 40	10 47	20 50	29 28	36 5	40 15
37 25	9 41	18 43	26 27	32 24	36 9	41 45	10 48	20 53	29 31	36 9	40 20
37 30	9 42	18 45	26 31	32 29	36 13	41 50	10 50	20 55	29 35	36 14	40 24
37 35	9 44	18 48	26 35	32 33	36 18	41 55	10 51	20 58	29 38	36 18	40 29
37 40	9 45	18 50	26 38	32 37	36 23	42 0	10 52	21 0	29 42	36 22	40 34
37 45	9 46	18 53	26 42	32 42	36 28	42 5	10 54	21 3	29 45	36 27	40 39
37 50	9 48	18 55	26 45	32 46	36 33	42 10	10 55	21 5	29 48	36 31	40 44
37 55	9 49	18 58	26 49	32 50	36 37	42 15	10 56	21 8	29 53	36 35	40 49
38 0	9 50	19 0	26 52	32 55	36 42	42 20	10 57	21 10	29 56	36 40	40 53
38 5	9 51	19 3	26 56	32 59	36 47	42 25	10 59	21 13	30 0	36 44	40 58
38 10	9 53	19 5	26 59	33 3	36 52	42 30	11 0	21 15	30 3	36 48	41 3
38 15	9 54	19 8	27 3	33 8	36 57	42 35	11 1	21 18	30 7	36 53	41 8
38 20	9 55	19 10	27 6	33 12	37 2	42 40	11 3	21 20	30 10	36 57	41 13
38 25	9 57	19 13	27 10	33 16	37 6	42 45	11 4	21 23	30 14	37 1	41 18
38 30	9 58	19 15	27 13	33 21	37 11	42 50	11 5	21 25	30 17	37 6	41 22
38 35	9 59	19 18	27 17	33 25	37 16	42 55	11 6	21 28	30 21	37 10	41 27
38 40	10 0	19 20	27 20	33 29	37 21	43 0	11 8	21 30	30 24	37 14	41 32
38 45	10 2	19 23	27 24	33 34	37 26	43 5	11 9	21 33	30 28	37 19	41 37
38 50	10 3	19 25	27 28	33 38	37 31	43 10	11 10	21 35	30 31	37 23	41 42
38 55	10 4	19 28	27 31	33 42	37 35	43 15	11 12	21 38	30 35	37 27	41 47
39 0	10 6	19 30	27 35	33 47	37 40	43 20	11 13	21 40	30 38	37 32	41 51

## Products of Arcs and Sines of Rhumbs.

Arcs	Sin 15° S <sub>1</sub>	Sin 30° S <sub>2</sub>	Sin 45° S <sub>3</sub>	Sin 60° S <sub>4</sub>	Sin 75° S <sub>5</sub>	Arcs	Sin 15° S <sub>1</sub>	Sin 30° S <sub>2</sub>	Sin 45° S <sub>3</sub>	Sin 60° S <sub>4</sub>	Sin 75° S <sub>5</sub>
43 25	11 14	21 43	30 42	37 36	41 56	44 25	11 30	22 13	31 24	38 28	42 54
43 30	11 16	21 46	30 46	37 40	42 1	44 30	11 31	22 15	31 28	38 32	42 59
43 35	11 17	21 48	30 49	37 45	42 6	44 35	11 32	22 18	31 32	38 37	43 4
43 40	11 18	21 50	30 53	37 49	42 11	44 40	11 34	22 20	31 35	38 41	43 9
43 45	11 19	21 53	30 56	37 53	42 16	44 45	11 35	22 23	31 39	38 45	43 14
43 50	11 21	21 55	31 0	37 58	42 20	44 50	11 36	22 25	31 42	38 50	43 18
43 55	11 22	21 58	31 3	38 2	42 25	44 55	11 38	22 28	31 46	38 54	43 23
44 0	11 23	22 0	31 7	38 6	42 30	45 0	11 39	22 30	31 49	38 58	43 28
44 5	11 25	22 3	31 10	38 11	42 35						
44 10	11 26	22 5	31 14	38 15	42 40						
44 15	11 27	22 8	31 17	38 19	42 45						
44 20	11 28	22 10	31 21	38 24	42 49						

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Gaylord Bros.  
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Syracuse, N. Y.  
PAT. JAN. 21, 1908

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