

*Indexed*

[PAI]

→ 1419

4550 WEST 77TH STREET, MINNEAPOLIS, MINNESOTA 55435 / 612-920-8600

~~2859~~  
2859

CONTROL DATA  
CORPORATION

105  
104

December 7, 1970

Mr. Neil J A Sloane  
Bell Laboratories  
600 Mountain Avenue  
Murray Hill, New Jersey 07974

Dear Mr. Sloane:

In reference to your letter of December 1, regarding the paper, "Polyomino Enumeration Results", which was presented at the SIAM Fall Meeting, December 1967, I would like to submit the following pages.

Sincerely,

*L. J. Lander (cm)*

L. J. Lander, General Manager  
Advanced Software Development

LJL:cm

Encl.

104, 105, 1419

1	2	3	4	5	6	7	8
104:	1,	2,	5,	12,	35,	107,	363
1419	1,	6,	37,	195			1248

1	2	3	4	5	6	7
105	1,	2,	5,	12,	35,	108...
	<del>1,</del>	<del>2,</del>	<del>5,</del>	<del>12,</del>	<del>35,</del>	<del>108...</del>

369

7

8

9

1285

*Indexed*

POLYOMINO ENUMERATION RESULTS

Presented at:

SIAM Fall Meeting

December 1, 1967

-Santa Barbara-

Authors: T. R. Parkin, Aerospace Corporation, El Segundo  
L. J. Lander, Aerospace Corporation, El Segundo  
D. R. Parkin, UCLA Computing Center, Los Angeles



(3 x J)

n	3x(n-2)	3x(n-3)	3x(n-4)	3x(n-5)	3x(n-6)	3x(n-7)	3x(n-8)	3x(n-9)	3x(n-10)	3x(n-11)
1										
2										
3										
4										
5	6									
6	15	7								
7	25	39	7							
8	35	96	59	3						
9	49	188	210	42	1					
10	63	332	550	255	21					
11	81	529	1231	954	212	4				
12	99	800	2406	2800	1184	103	1			
13	121	1142	4313	6818	4634	964	33			
14	143	1580	7171	14722	14182	5497	546	6		
15	169	2107	11304	28760	36919	22011	4743	187	1	
16	---	---	---	---	---	---	---	2833	47	
17	---	---	---	---	---	---	---	---	1173	6
18	---	---	---	---	---	---	---	---	---	324
19										
20										
21										
22										
23										
24										
n	3x(n-12)	3x(n-13)	3x(n-14)	3x(n-15)	3x(n-16)	3x(n-17)	3x(n-18)	3x(n-19)	3x(n-20)	3x(n-21)
18	1									
19	64									
20		8								
21			1							

Partial results beyond N = 15 due to Stein and Walden, 3/12/63.



(4 x J)

n	4x(n-3)	4x(n-4)	4x(n-5)	4x(n-6)	4x(n-7)	4x(n-8)	4x(n-9)	4x(n-10)	4x(n-11)	4x(n-12)
1										
2										
3										
4										
5										
6										
7	18									
8	61	77								
9	97	383	181							
10	155	822	1304	266						
11	220	1551	3548	2847	251					
12	313	2680	8239	10323	4441	168				
13	415	4327	16821	29442	21995	5008	66			
14	551	6634	31576	71742	79155	36035	4168	20		
15	698	9751	55083	155995	231017	167459	45749	2439	3	
16	-----	-----	-----	-----	-----	-----	-----	45289	1008	1
17	-----	-----	-----	-----	-----	-----	-----	-----	34112	271
18	-----	-----	-----	-----	-----	-----	-----	-----	-----	19282
19										
20										
21										
22										
23										
24										
n	4x(n-13)	4x(n-14)	4x(n-15)	4x(n-16)	4x(n-17)	4x(n-18)	4x(n-19)			
18	55									
19	7852	6								
20		2347	1							
21			479							
22				77						
23					6					
24						1				

Partial results beyond N = 15 due to Stein and Walden, 3/12/63.

(5 x J)

n	5x(n-4)	5x(n-5)	5x(n-6)	5x(n-7)	5x(n-8)	5x(n-9)	5x(n-10)	5x(n-11)	5x(n-12)	5x(n-13)
1										
2										
3										
4										
5										
6										
7										
8										
9	73									
10	240	529								
11	410	2366	2413							
12	646	4738	13161	7375						
13	979	8683	30998	51133	17041					
14	1415	14894	65236	143230	153122	30320				
15	1993	24223	126503	348083	517407	366951	42670			
16	-----	-----	-----	-----	-----	-----	-----	47344		
17	-----	-----	-----	-----	-----	-----	-----	-----	41330	
18	-----	-----	-----	-----	-----	-----	-----	-----	-----	27764
19										
20										
n	5x(n-14)	5x(n-15)	5x(n-16)	5x(n-17)	5x(n-18)	5x(n-19)	5x(n-20)	5x(n-21)		
19	14083									
20		5279								
21			1470							
22				302						
23					48					
24	-----	-----	-----	-----	-----	6				
25	-----	-----	-----	-----	-----	-----	1			

Partial results beyond N = 15 due to Stein and Walden, 3/12/63.

(6 x J)

n	6x(n-5)	6x(n-6)	6x(n-7)	6x(n-8)	6x(n-9)	6x(n-10)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11	255					
12	908	2835				
13	1553	11952	18533			
14	2555	23215	89212	86974		
15	3983	42256	194015	483509	323559	
16						
17						
18						
19						
20						



(7 x J)

n	$7x(n-6)$	$7x(n-7)$	$7x(n-8)$	$7x(n-9)$
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13	950			
14	3417	13402		
15	6041	55132	111425	
16				
17				
18				
19				
20				

(8 x J)

n	$8x(n-7)$	$8x(n-8)$	$8x(n-9)$	$8x(n-10)$
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	3492			
16				
17				
18				
19				
20				

Summary

n	1xJ	2xJ	3xJ	4xJ	5xJ	6xJ	7xJ	8xJ	Pn Total
1	1								1
2	1								1
3	1	1							2
4	1	4							5
5	1	5	6						12
6	1	12	22						35
7	1	18	71	18					108
8	1	37	193	138					369
9	1	60	490	661	73				1285
10	1	117	1221	2547	769				4655
11	1	200	3011	8417	5189	255			17073
12	1	379	7393	26164	25920	3743			63600
13	1	669	18025	78074	108834	32038	950		238591
14	1	1250	43847	229881	408217	201956	16819		901971
15	1	2247	106201	668194	1427830	1047322	172598	3492	<del>3427885</del>
16	1								
17	1								
18	1								
19	1								
20	1								
21	1								
22	1								
23	1								
24	1								

*doubtful!*

Symmetry Class Code

(All shapes in minimum value orientation.)

Symmetry Code

Symmetry

Rectangular Shapes

15	None
1	Symmetric about a vertical axis
2	Symmetric about a horizontal axis
3	Symmetric under 180° rotation
4	Symmetric about both horizontal and vertical axis

Square Shapes

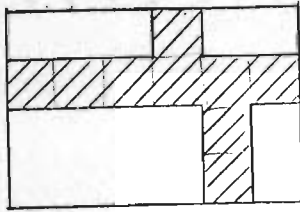
5	None
6	Vertical axis
7	Horizontal axis
8	180° rotation
9	Left diagonal
10	Right diagonal
11	Both horizontal and vertical axis
12	Horizontal, vertical and 90° rotation
13	90° rotation
14	Both left and right diagonal.

Samples of each class on next page.

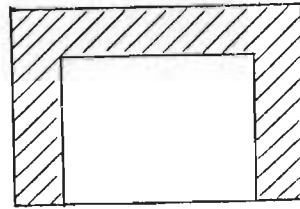


Examples of Symmetries of Polyominoes

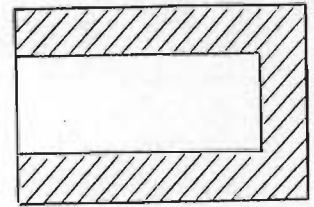
Rectangular Cases



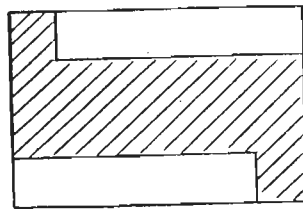
15



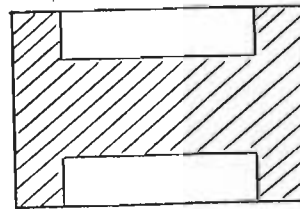
1



2

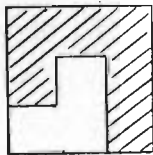


3

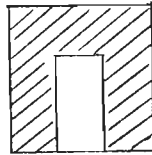


4

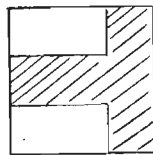
Square Cases



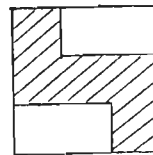
5



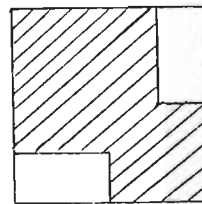
6



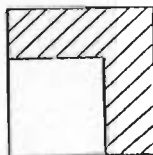
7



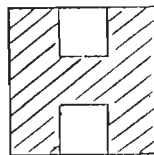
8



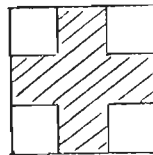
9



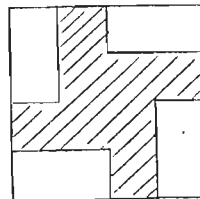
10



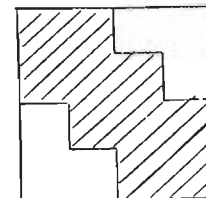
11



12



13



14

Symmetry Class

N	W x L	Rectangular					Square								Totals		
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
1	1 x 1													1			1
N=1 Totals														1			1
2	1 x 2					1											1
N=2 Totals						1											1
3	1 x 3					1											1
	2 x 2										1						1
N=3 Totals						1					1						2
4	1 x 4					1											1
	2 x 2												1				1
	2 x 3	1	1		1												3
N=4 Totals		1	1		1	1								1			5
5	1 x 5					1											1
	2 x 3	1	1														2
	2 x 4	3															3
	3 x 3						1	1	1		2		1				6
N=5 Totals		4	1			1	1	1	1		2		1				12
6	1 x 6					1											1
	2 x 3					1											1
	2 x 4	3	2		1												6
	2 x 5	3	1		1												5
	3 x 3						4	1			2						7
	3 x 4	10		2	3												15
N=6 Totals		16	3	2	5	2	4	1			2						35
7	1 x 7					1											1
	2 x 4	2															2
	2 x 5	8	3														11
	2 x 6	5															5
	3 x 3						2	2			1	1			1		7
	3 x 4	38		1													39
	3 x 5	17	1	2	4	1											25
	4 x 4						12				6						18
N=7 Totals		70	4	3	4	2	14	2			7	1			1		108

Symmetry Class

N	W x L	Rectangular					Square								Totals		
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
8	1 x 8					1											1
	2 x 4					1											1
	2 x 5	6	2		2												10
	2 x 6	14	4		1												19
	2 x 7	5	1		1												7
	3 x 3							1			1		1				3
	3 x 4	48	3	3	3	2											59
	3 x 5	92	3	1													96
	3 x 6	27		3	5												35
	4 x 4						70			1	4				1	1	77
4 x 5	54	2		5												61	
N=8 Totals		246	15	7	17	4	70	1	1	5		1	1	1			369
9	1 x 9					1											1
	2 x 5	2	1														3
	2 x 6	22															22
	2 x 7	23	5														28
	2 x 8	7															7
	3 x 3												1				1
	3 x 4	37		5													42
	3 x 5	183	12	5	8	2											210
	3 x 6	187		1													188
	3 x 7	38	1	3	6	1											49
	4 x 4						168				2	11					181
	4 x 5	380	3														383
	4 x 6	97															97
5 x 5						52		2	5	13		1				73	
N=9 Totals		976	22	14	14	4	220		2	5	2	24		2			1285

Symmetry Class

N	W x L	Rectangular					Square								Totals		
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
10	1 x 10					1											1
	2 x 5					1											1
	2 x 6	10	3		2												15
	2 x 7	44	4		4												52
	2 x 8	33	6		1												40
	2 x 9	7	1		1												9
	3 x 4	11	2	4	2	2											21
	3 x 5	239	9	5	1	1											255
	3 x 6	518	11	7	11	3											550
	3 x 7	326	5	1													332
	3 x 8	52		4	7												63
	4 x 4						244	3	3	3	3	9				1	266
	4 x 5	1273	14		17												1304
	4 x 6	816			6												822
	4 x 7	146	2		7												155
	5 x 5						516		3		1	9					529
	5 x 6	226		3	11												240
N = 10 Totals		3701	57	24	70	8	760	3	6	3	4	18				1	4655



Symmetry Class

N	W x L	Rectangular					Square								Totals		
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
						1											1
11	1 x 11																3
	2 x 6	3															45
	2 x 7	40	5														90
	2 x 8	90															53
	2 x 9	46	7														9
	2 x 10	9															4
	3 x 4	2		2													212
	3 x 5	179	12	10	7	4											954
	3 x 6	947		7													1231
	3 x 7	1172	26	10	20	3											529
	3 x 8	528		1													81
	3 x 9	67	1	4	8	1											251
	4 x 4						237				3	11					2847
	4 x 5	2817	30														3548
	4 x 6	3548															1551
	4 x 7	1546	5														220
	4 x 8	220															2413
	5 x 5						2324	6	13	20	4	44				2	2366
	5 x 6	2363		3													410
	5 x 7	386	2	3	18	1											255
	6 x 6						226					29					
N = 11 Totals		13963	88	40	53	10	2787	6	13	20	7	84				2	17073

Symmetry Class

N	W x L	Rectangular					Square										Totals
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
12	1 x 12					1											1
	2 x 6					1											1
	2 x 7	15	3		3												21
	2 x 8	106	9		4												119
	2 x 9	146	6		6												158
	2 x 10	60	8		1												69
	2 x 11	9	1		1												11
	3 x 4					1											1
	3 x 5	83	7	10	1	2											103
	3 x 6	1128	21	16	17	2											1184
	3 x 7	2764	26	8	1	1											2800
	3 x 8	2341	23	13	25	4											2406
	3 x 9	792	7	1													800
	3 x 10	85		5	9												99
	4 x 4						143	5	2	2	2	9	1	2	1	1	168
	4 x 5	4359	43	7	30	2											4441
	4 x 6	10275	25		23												10323
	4 x 7	8173	26		40												8239
	4 x 8	2672			8												2680
	4 x 9	302	2		9												313
	5 x 5						7293	8	19	2	10	40		1	1	1	7375
	5 x 6	13083		25	53												13161
	5 x 7	4730	5	3													4738
	5 x 8	623		4	19												646
	6 x 6						2810			5	1	17			1	1	2835
	6 x 7	886	3		19												908
N = 12 Totals		52632	215	92	269	14	10246	13	21	9	13	66	1	3	3	3	63600

Symmetry Class

N	W x L	Rectangular					Square										Totals By W & L	
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
13	1 x 13					1												1
	2 x 7	3	1															4
	2 x 8	73																73
	2 x 9	244	13															257
	2 x 10	238																238
	2 x 11	77	9															86
	2 x 12	11																11
	3 x 5	19	3	6	2	3												33
	3 x 6	943		21														964
	3 x 7	4507	62	24	37	4												4634
	3 x 8	6808		10														6818
	3 x 9	4210	44	17	38	4												4313
	3 x 10	1141		1														1142
	3 x 11	104	1	5	10	1												121
	4 x 4						56				2	8						66
	4 x 5	4948	60															5008
	4 x 6	21995																21995
	4 x 7	29366	76															29442
	4 x 8	16821																16821
	4 x 9	4320	7															4327
	4 x 10	415																415
	5 x 5						16795	29	60	44	15	89	3	1	2	3		17041
	5 x 6	51100		33														51133
	5 x 7	30828	33	32	105													30998
	5 x 8	8680		3														8683
	5 x 9	944	2	4	28	1												979
	6 x 6						18381				13	139						18533
	6 x 7	11947	5															11952
	6 x 8	1553																1553
	7 x 7						867		3	19		60		1				950
N=13 Totals		201295	316	156	220	14	36099	29	63	63	30	296	3	2	2	3		238591

Symmetry Class

N	W x L	Rectangular				Square								Totals			
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
14	1 x 14					1											1
	2 x 7					1											1
	2 x 8	21	4		3												28
	2 x 9	219	9		9												237
	2 x 10	480	19		6												505
	2 x 11	344	8		8												360
	2 x 12	95	10		1												106
	2 x 13	11	1		1												13
	3 x 5	2	1	2		1											6
	3 x 6	491	13	24	12	6											546
	3 x 7	5416	46	28	6	1											5497
	3 x 8	14010	76	37	57	2											14182
	3 x 9	14656	53	11	1	1											14722
	3 x 10	7061	39	21	45	5											7171
	3 x 11	1570	9	1													1580
	3 x 12	126		6	11												143
	4 x 4						10	3	1	1	1	2				2	20
	4 x 5	4055	59	16	32	6											4168
	4 x 6	35898	77	10	50												36035
	4 x 7	78908	135		112												79155
	4 x 8	71632	60		50												71742
	4 x 9	31463	40		73												31576
	4 x 10	6624			10												6634
	4 x 11	538	2		11												551
	5 x 5						30069	44	72	10	22	100	2			1	30320
	5 x 6	152809	40	111	159	3											153122
	5 x 7	143123	60	38	8	1											143230
	5 x 8	65072		40	124												65236
	5 x 9	14884	7	3													14894
	5 x 10	1381		5	29												1415
	6 x 6						86799			33	29	111				2	86974
	6 x 7	89045	41		126												89212
	6 x 8	23195			20												23215
	6 x 9	2523	3		29												2555
	7 x 7						13361		5		2	34					13402
	7 x 8	3374		4	39												3417
N = 14 Totals		769026	812	357	1032	28	130239	47	78	44	54	247	2			5	901971



Symmetry Class

N	W x L	Rectangular					Square								Totals		
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
15	1 x 15					1											1
	2 x 8	4															4
	2 x 9	112	7														119
	2 x 10	591															591
	2 x 11	870	25														895
	2 x 12	498															498
	2 x 13	116	11														127
	2 x 14	13															13
	3 x 5					1											1
	3 x 6	167		20													187
	3 x 7	4592	61	46	37	7											4743
	3 x 8	21971		40													22011
	3 x 9	36592	168	51	103	5											36919
	3 x 10	28747		13													28760
	3 x 11	11145	66	26	62	5											11304
	3 x 12	2106		1													2107
	3 x 13	149	1	6	12	1											169
	4 x 4						1					2					3
	4 x 5	2390	49														2439
	4 x 6	45749															45749
	4 x 7	167171	288														167459
	4 x 8	231017															231017
	4 x 9	155845	150														155995
	4 x 10	55083															55083
	4 x 11	9742	9														9751
	4 x 12	698															698
	5 x 5							42207	110	111	66	34	132	6		4	42670
	5 x 6	366756		195													366951
	5 x 7	516641	251	151	357	7											517407
	5 x 8	348039		44													348083
	5 x 9	126192	49	49	213												126503

N = 15 continued on next page.

Symmetry Class

N	W x L	Rectangular					Square										Totals
		15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	By W & L
15	5 x 10	24220		3													24223
	5 x 11	1945	2	5	40	1											1993
	6 x 6						323071				81	407					323559
	6 x 7	483441	68														483509
	6 x 8	194015															194015
	6 x 9	42249	7														42256
	6 x 10	3983															3983
	7 x 7						110832	7	43	135	17	389				2	111425
	7 x 8	55127		5													55132
	7 x 9	5965	3	4	68	1											6041
	8 x 8						3367					125					3492
N = 15 Totals		2943941	1215	659	892	29	479478	117	154	201	132	1055	6			6	3427885

Symmetry Summary

N	Rectangular			Square			Total		P(N)
	Sym	Non-Sym	Total	Sym	Non-Sym	Total	Sym	Non-Sym	
1	0	0	0	1	0	1	1	0	1
2	1	0	1	0	0	0	1	0	1
3	1	0	1	1	0	1	2	0	2
4	3	1	4	1	0	1	4	1	5
5	2	4	6	1	5	6	3	9	12
6	12	16	28	3	4	7	16	19	35
7	13	70	83	11	14	25	24	84	108
8	43	246	289	10	70	80	53	316	369
9	54	976	1030	35	220	255	89	1196	1285
10	159	3701	3860	35	760	795	194	4461	4655
11	191	13963	14154	132	2787	2919	323	16750	17073
12	590	52632	53222	132	10246	10378	722	62878	63600
13	706	201295	202001	491	36099	36590	1197	237394	238591
14	2229	769026	771255	477	130239	130716	2706	899265	901971
15	2795	2943941	2946736	1671	479478	481149	4466	3423419	3427885

~~2946736~~

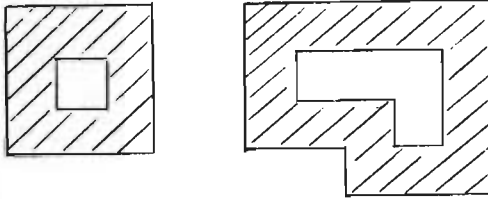
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105

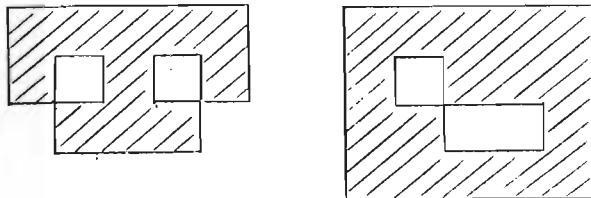
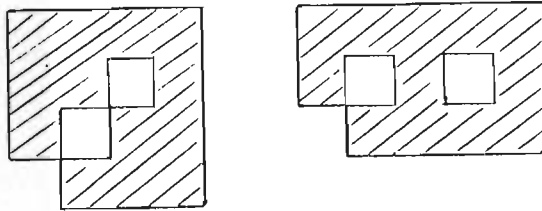
Categorization of Holes



Single Pseudo-Hole



Single Real-Hole



Multiple Holes



Holes by Type, N, W, L

N	W x L	Holes			All Types Total	P(N)
		Pseudo-	Real-	Multiple-		
7	3 x 3	1	0	0	1	7
N = 7 Totals		1	0	0	1	
8	3 x 3	0	1	0	1	3
	3 x 4	5	0	0	5	59
N = 8 Totals		5	1	0	6	
9	3 x 4	6	2	0	8	42
	3 x 5	11	0	0	11	210
	4 x 4	18	0	0	18	181
N = 9 Totals		35	2	0	37	
10	3 x 4	2	3	0	5	21
	3 x 5	34	6	0	40	255
	3 x 6	17	0	0	17	550
	4 x 4	45	7	0	52	266
	4 x 5	81	0	0	81	1304
N = 10 Totals		179	16	0	195	
11	3 x 4	0	1	0	1	4
	3 x 5	37	12	2	51	212
	3 x 6	95	7	0	102	954
	3 x 7	23	0	0	23	1231
	4 x 4	60	16	2	78	251
	4 x 5	417	34	0	451	2847
	4 x 6	145	0	0	145	3548
	5 x 5	128	0	0	128	2413
N = 11 Totals		905	70	4	979	
12	3 x 5	17	16	2	35	103
	3 x 6	201	35	4	240	1184
	3 x 7	190	11	0	201	2800
	3 x 8	29	0	0	29	2406
	4 x 4	40	23	4	67	168
	4 x 5	980	167	31	1178	4441
	4 x 6	1141	60	0	1201	10323
	4 x 7	223	0	0	223	8239
	5 x 5	932	64	0	996	7375
	5 x 6	493	0	0	493	13161
N = 12 Totals		4246	376	41	4663	

N	W x L	Holes				All Types Total	P(N)
		Pseudo-	Real-	Multiple-			
13	3 x 5	3	6	1	10	33	
	3 x 6	212	69	14	295	964	
	3 x 7	633	67	10	710	4634	
	3 x 8	319	12	0	331	6818	
	3 x 9	35	0	0	35	4313	
	4 x 4	13	14	3	30	66	
	4 x 5	1369	372	122	1863	5008	
	4 x 6	4109	463	94	4666	21995	
	4 x 7	2378	95	0	2473	29442	
	4 x 8	315	0	0	315	16821	
	5 x 5	3462	419	102	3983	17041	
	5 x 6	5103	233	0	5336	51133	
	5 x 7	849	0	0	849	30998	
	6 x 6	578	0	0	578	18533	
	N = 13 Totals		19378	1750	346	21474	
14	3 x 5	0	2	0	2	6	
	3 x 6	114	71	21	206	546	
	3 x 7	1128	224	50	1402	5497	
	3 x 8	1480	114	12	1606	14182	
	3 x 9	482	16	0	498	14722	
	3 x 10	41	0	0	41	7171	
	4 x 4	2	5	1	8	20	
	4 x 5	1222	506	226	1954	4168	
	4 x 6	9085	1624	647	11356	36035	
	4 x 7	11774	980	189	12943	79155	
	4 x 8	4248	133	0	4381	71742	
	4 x 9	421	0	0	421	31576	
	5 x 5	8060	1514	657	10231	30320	
	5 x 6	26055	2372	584	29011	153122	
	5 x 7	11032	410	0	11442	143230	
	5 x 8	1329	0	0	1329	65236	
	6 x 6	7201	279	0	7480	86974	
6 x 7	2185	0	0	2185	89212		
N = 14 Totals		85859	8250	2387	96496		

N	W x L	Holes			All Types	P(N)
		Pseudo-	Real-	Multiple-	Total	
15	3 x 6	32	37	8	77	187
	3 x 7	1149	366	142	1657	4743
	3 x 8	3830	510	107	4447	22011
	3 x 9	2892	170	18	3080	36919
	3 x 10	679	17	0	696	28760
	3 x 11	47	0	0	47	11304
	4 x 4	0	1	0	1	3
	4 x 5	685	431	216	1332	2439
	4 x 6	13656	3453	2029	19138	45749
	4 x 7	36355	4726	1851	42932	167459
	4 x 8	26973	1745	281	28999	231017
	4 x 9	6871	180	0	7051	155995
	4 x 10	541	0	0	541	55083
	5 x 5	13186	3341	2163	18690	42670
	5 x 6	86561	11806	5740	104107	366951
	5 x 7	71545	5170	1171	77886	517407
	5 x 8	20764	632	0	21396	348083
	5 x 9	1951	0	0	1951	126503
	6 x 6	47009	3490	903	51402	323559
	6 x 7	32694	1059	0	33753	483509
	6 x 8	3806	0	0	3806	194015
	7 x 7	2376	0	0	2376	111425
N = 15 Totals		373602	37134	14629	425365	