Eupompus gave Splendour to Art by Numbers

Ben Jonson

OUR HEXAG

or

PHILOSOPHICAL GAS 74

Volume 18 Number 2 April 1988

In this issue

The Foundations of Prestressed Concrete Verse

GNOMENCLUTTER

or

Thirty-One Hexagonies
of James Joyce

Let me finger their eurhythmytic.

Thelma Mina Fretta Opsy Celia Jess
Hilda Mina Ada Anna Wanda Lou
Ita Mina Katty Livia Delia Poll
Ruth Thelma Ada Livia Zulma Vela
Thelma Trix Katty Gilda Plurabelle Lou
Yva Queenie Ita Ruth Lou Jess

Opsy Hilda Saucy Livia Yva Trix
Nippa Katty Opsy Ruth Anna Bett
Ena Gilda Saucy Mina Una Ruth

Hilda Delia Fretta Phoebe Plurabelle Ruth
Ena Thelma Wanda Delia Yva Bett
Xenia Poll Celia Ruth Wanda Trix
Ada Celia Una Phoebe Yva Katty
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Nippa Hilda Thelma Queenie Una Poll
Ita Hilda Zulma Gilda Celia Bett
Ena Fretta Nippa Ita Ada Trix
Saucy Fretta Zulma Queenie Wanda Katty

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Fretta Una Xenia Bett Livia Lou

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Yva Mina Zulma Xenia Nippa Plurabelle
Celia Delia Saucy Nippa Vela Lou
Ena Celia Queenie Anna Livia Plurabelle

[26.11.84]

OUR HEXAG

Or *Philosophical Gas: the Journal of Alternative Pugilistics* volume 18 number 2 whole number 74, published for ANZAPA, FAPA and a small circle of friends and admirers (well, more of a triangle than a circle) by John Bangsund, PO Box 9, Bundoora, Victoria 3083, Australia. With this issue *Philosophical Gas: the Journal of Significant Imponderables* makes a further bid to confuse future librarians by adopting a volume/number system, based on the verifiable fact that the first issue appeared in September 1970. About ten years ago I inadvertently published about a dozen issues of *Parergon Papers*, but no-one seemed to notice the new name, and when Bruce Gillespie referred to the latest issue, in print, as *Philosophical Gas* I gave up and quietly reverted to the old name. This caused an odd gap in the numbering, but no-one has complained about it so far. This issue is tentatively dated April 1988.

27 March What do I want to write about? Nothing, really. I'd rather be curled up with a good string quartet. There was a heavy sort of party last night at Jenny Lee's place, and I think I smoked too much or had a drop too much of post-structuralist discourse, so I feel a bit crook today, certainly in no state to do anything productive, like copy-editing, of which there's a fair bit I should be doing. I'm not even sure I should be driving this IBM. But I owe ANZAPA three pages, and I don't think Gerald Smith OBE will be satisfied with the eight pages of *The Society of Editors Newsletter* I'm sending him. I'll probably write about that issue of the newsletter. I should say something about the new Tasmanian school of post-factualist historiograffiti, maybe something about my adventures in computing. And since I've boldly typed "Our Hexag" up there, I doubt that I'll get far without mentioning prestressed concrete verse. But I'll start with Jenny Lee.

In fact I started with Jenny Lee on Tuesday 8 March. Jenny, editor of Australia's foremost mainstream fanzine, *Meanjin*, is a wholly admirable and very courageous lady; letting the likes of Damien Broderick, Gerald Murnane, Morris Lurie, Peter Craven and me into her house, along with a lot of alcohol, tends to support that, and appointing me assistant editor of *Meanjin* confirms it. John Foyster kindly gave me his fond condolences on this appointment, reminding me that I had once been *editor* of a literary journal, and he said it so nicely (you know that way he has) that I almost forbore to mention that this is a paying job. Five days a fortnight, top rates, holidays, sick leave, the works — even free parking. Readers in the wide open spaces of New York, Los Angeles and Minneapolis may not readily appreciate how delighted I am to have a parking spot behind the *Meanjin* office, just off Grattan Street, Parkville, and free to boot. I'd better rush on to explain to kindly old Hangin' Judge Speer there in Albuquerque that Grattan Street, Parkville, is about one US mile (1.6 km) from the Melbourne GPO. I wish it were so close to where I live. There's something vaguely idiotic about living opposite LaTrobe University and working opposite the University of Melbourne, commuting between these Graves of Ocademe. And something vaguely wonderful about suddenly finding myself on the University's payroll.

Jenny is a historian, among other things, co-editor with Verity Burgmann of *A People's History of Australia* (McPhee Gribble / Penguin, Melbourne, 1988, 4 volumes). She became editor of *Meanjin* in March last year, and is only the fourth person to hold the job (her predecessors were Judy Brett, 1982-87, Jim Davidson, 1974-82, and Clem Christesen, who founded the journal in 1940). *Meanjin* is prepared on disk, and so these days is most of the material submitted for publication. Jenny is a dab hand at computing, plain and fancy, which is fortunate, because until 8 March I knew practically nothing about it. A few years ago I spent a couple of hours on one of the Royal Melbourne Institute of Technology School of Journalism's Panterms, and an hour or so playing with Damien Broderick's cute little Kaypro, on both occasions wondering what I was doing. Now I've been thrown in at the deep end — and I love it. After seven or eight hours of basically self-tuition I was editing on-screen. Naturally, I now want a computer of my own. This old IBM does a nicer print job, but I write much more easily on the computer. Being paid to learn how to use a PC was one of the many things that attracted me to the job. Not knowing how to use one was why I thought I wouldn't get it, but as I said, Jenny is a courageous lady. Also great fun to work with. And by the happiest of chances, the first issue of *Meanjin* I get to work on is largely devoted to music.

1 April Also Good Friday, and the birthday of Busoni and Rakhmaninov. Getting *very* close to ANZAPA's deadline. I'd better rush on to say something about prestressed concrete verse. ANZAPA has seen and largely been mystified by the gradual unfolding of this art-form; FAPA, I think, has seen only an odd sort of reference to it in PG 70. I have so many copies of PG 68 (August 1985) here that I am fairly confident FAPA never saw it, and that issue contained my first public outburst on the subject. Basically, prestressed concrete verse begins in playing with interesting manipulations of numbers, and continues in substituting words for numbers. From my work on articles about contemporary Australian music for *Meanjin* 2/1988 I am beginning to believe that prestressed concrete verse really is a legitimate art-form, not just an amusing game I invented; from my acquaintance (I can't call it work, because I don't understand the half of it yet) with articles on poststructuralism in the same issue I think I can say confidently that it is both a game and an art-form, and neither a game nor an art-form. (Notice how "post-structuralism" lost its hyphen that time, Jack? With a computer I could just whip back and bung it in.) What bothers mathematicians about prestressed concrete verse is that they don't know what I'm talking about. I don't speak their language, so it's hard to tell them what I am doing, let alone explain the problems I think they can help me with. So for the rest of this issue I will carefully set out some of

The Foundations of Prestressed Concrete Verse

We know that there are six pairs of numbers in four numbers: 1,2; 1,3; 1,4; 2,3; 2,4; 3,4. Apparently the approved method of establishing this is:

$$\frac{3 \times 4}{1 \times 2}$$

$$= \frac{12}{2}$$

$$= 6$$

The numbers can be presented in pairs like this:

```
1 2
3 4

1 3
2 4

1 4
2 3
```

I will be referring to this kind of presentation as "blocks". In the column above there are three blocks, each containing all of the numbers I am concerned with.

The first form of prestressed concrete verse, and the only one I will deal with here, is based on *prime numbers*: 2, 3, 5, 7 and so on. To be exact, it uses the *squares of primes* and *squares of primes plus the prime plus one*. The column above illustrates the basic form of a prime squared: 2 x 2 (= 4). The following column illustrates the basic form of a prime squared plus prime plus one: (2 x 2) + 2 + 1 (= 7). To relate it to the first column I will put the numbers 5 to 7 in bold type.

5 **6** **7**
5 1 2
5 3 4

6 1 3
6 2 4

7 1 4
7 2 3

The more logical way of presenting this starts at 1:

```
1 2 3
1 4 5
1 6 7

2 4 6
2 5 7

3 4 7
3 5 6
```

We know that there are 21 pairs of numbers in seven numbers:

$$\frac{6 \times 7}{1 \times 2}$$

$$= \frac{42}{2}$$

$$= 21$$

We know that there are three pairs of numbers in three numbers (1,2; 1,3; 2,3). In my seven rows of three numbers above there must be 21 pairs (3 pairs per line, multiplied by 7 lines). As it happens, there are not just *any* 21 pairs in those seven rows, but *the* 21 pairs in 7: 1,2; 1,3; 1,4; and so on to 6,7. If you look at the two columns of seven above you will notice that they have only one line in common (**6** 2 4 in the first, 2 4 6 in the second), but both contain *all the pairs in 7* without duplication.

The most basic prestressed concrete verse may be constructed on the two columns I have so far presented. For example, let us substitute the words *the quick brown fox jumps over dog* for the numbers 1 to 7:

1 2	the quick
3 4	brown fox
1 3	the brown
2 4	quick fox
1 4	the fox
2 3	quick brown
1 2 3	the quick brown
1 4 5	the fox jumps
1 6 7	the over dog
2 4 6	quick fox over
2 5 7	quick jumps dog
3 4 7	brown fox dog
3 5 6	brown jumps over

We proceed to the prime number 3 and its square (3 x 3), 9. There are 36 pairs in 9:

$$\frac{8 \times 9}{1 \times 2}$$

$$= \frac{72}{2}$$

$$= 36$$

And we arrange them, rather brilliantly (though I say so myself), thus:

1 2 3
4 5 6
7 8 9

1 4 7
2 5 8
3 6 9

1 6 8
2 4 9
3 5 7

1 5 9
2 6 7
3 4 8

Here we have 12 lines of three, each line containing three pairs, so 12 x 3 = 36, the 36 pairs in nine numbers, without duplication. Note also that each of the four blocks contains the numbers 1 to 9.

It is essential to understand what is going on in that column. (I was going to say "essential to understand how I did that", but I don't know *how* I first discovered the manipulation. For all I know, it's the sort of thing now taught in grade school, but I just happened on it a few years ago. My nephew Mark Warren taught me to call it manipulation.) See how the first block is simply tipped over to form the second. Note that what was originally the top line (1 2 3) retains its sequence as you read down the column:

1	1	1
2	2	2
3	3	3

The original second line (4 5 6) moves down a line at a time through the blocks:

4	6	5
5	4	6
6	5	4

And the original third line (7 8 9) moves down two lines at a time:

7	8	9
8	9	7
9	7	8

Look at the diagonal lines in the blocks. Another way of constructing the column is to use the first diagonal (1 5 9):

1	2	3
4	5	6
7	8	9

1	5	9
2	6	7
3	4	8

Then the second:

1	6	8
2	4	9
3	5	7

And the third:

1	4	7
2	5	8
3	6	9

Same result, just a different ordering of the blocks. (When we get to blocks of 25, 49, 121 and so on, the diagonal method becomes very useful.)

Next, prime squared (3 x 3) plus prime (3) plus one: 13.
There are 78 pairs in 13 numbers: (12 x 13) ÷ (1 x 2) = 78.
There are six pairs in four numbers (do it yourself).
Divide 78 by 6 = 13, so 13 lines of four numbers should give us all the pairs in 13. And arranged like this, they do:

1	2	3	4
1	5	6	7
1	8	9	10
1	11	12	13
2	5	8	11
2	6	9	12
2	7	10	13
3	5	10	12
3	6	8	13
3	7	9	11
4	5	9	13
4	6	10	11
4	7	8	12

A Digression

The original purpose of this number-manipulation that accidentally led to my invention of prestressed concrete verse (as I explained in PG 68: if you would like a copy, please ask) was *to lose money more efficiently in the game of Tattslotto*. So far I have dealt only with the *pairs* in certain numbers; in Tattslotto you need six numbers correct out of 45 to win a major prize, five or four correct to win a lesser prize; so, not being greedy, or recognizing the odds against getting the six numbers (there being 8,145,060 possible combinations in 45), I tried to find cheap, simple ways of getting *fours* and *fives*.

For example, you can buy a "System 9" entry in Tattslotto (they now provide system entries for anything from 7 to 20 numbers), which gives you every possible six in nine numbers — that is, 84 entries in one. (You do the arithmetic: multiply the numbers 4 to 9; multiply 1 to 6; divide former by latter — 84 sixes in 9.) My "little System 9" requires only 12 entries, but provides every *four* in 9. And it is derived very simply from the column on page 752, combining the three lines from each block:

1 2 3	1 2 3 4 5 6
4 5 6	1 2 3 7 8 9
7 8 9	4 5 6 7 8 9
1 4 7	1 2 4 5 7 8
2 5 8	1 3 4 6 7 9
3 6 9	2 3 5 6 8 9
1 6 8	1 2 4 6 8 9
2 4 9	1 3 5 6 7 8
3 5 7	2 3 4 5 7 9
1 5 9	1 2 5 6 7 9
2 6 7	1 3 4 5 8 9
3 4 8	2 3 4 6 7 8

There are 126 fours in 9. In my twelve lines of six there are 180 fours, including the 126 needed and 54 duplicates. There are also 126 fives in 9, of which I have 72 there. I suspect (but since the thought occurred to me only while typing this paragraph, can't prove yet) that I can find all 126 fives in 24 lines.

If you take the 13-number column on page 753 and combine every line with every other line — that is, 1 2 3 4 with the other twelve lines, 1 5 6 7 with the remaining eleven, and so on — you will finish up with 78 lines of seven numbers. These 78 lines provide all 1287 fives in 13, with 351 duplicates. This knowledge is of little practical application to Tattslotto: their System 13 costs \$431, my "little System 13" \$150.15 — a saving, certainly, but I aim to *win* \$150, not chuck it away.

The Problem of the Perfect Nine

On the next page I will set out a work-sheet that should drive you fairly crazy if you want to go on playing this game.

I decided some time ago that I would like to experiment with prestressed concrete verse based on *threes* rather than pairs, and 9 seemed a good number to work on, because it just so happens that there are 84 threes in 9; and as we have already seen, 12 of those threes provide us with all the pairs in 9; so might it not be that seven columns could be constructed, each following the basic pattern I have established (p.752 and above), each containing the 36 pairs without duplication, but the seven columns containing the 84 *threes* without duplication?

On the *next* page is the work-sheet. What you should do with it requires a little more explanation.

Any group of three numbers may be expressed six different ways — 5 6 9, 5 9 6, 6 5 9, 6 9 5, 9 5 6, 9 6 5 — but for the purpose of this exercise they remain the same three.

The work-sheet gives you all 84 threes in the numbers 1 to 9, expressed in normal sequence, and the basic pattern that you must somehow follow. How you go about completing the seven columns is your problem. The following *incorrect* solution may get you started.

---

1 2 3	1 2 4	1 2 5	1 2 6	1 2 7	1 2 8	1 2 9
4 5 6	3 7 8	3 6 7	3 5 9	3 5 6	7 5 6	8 5 6
7 8 9	9 5 6	(4 8 9)	(7 4 8)	8 9 4	9 4 3	4 3 7
1 4 7	1 3 9	1 3 4	1 3 7	1 3 8	1 7 9	1 8 4
2 5 8	2 7 5	(2 6 8)	(2 5 4)	2 5 9	2 5 4	2 5 3
3 6 9	4 8 6	5 7 9	6 9 8	7 6 4	8 6 3	9 6 7
1 6 8	1 8 5	1 7 8	1 9 4	1 6 9	1 6 4	1 6 3
2 4 9	2 3 6	2 3 9	2 3 8	2 3 4	2 7 3	2 8 7
3 5 7	4 7 9	(5 6 4)	(6 5 7)	7 5 8	8 5 9	9 5 4
1 5 9	1 7 6	(1 6 9)	(1 5 8)	1 5 4	1 5 3	1 5 7
2 6 7	2 8 9	2 7 4	2 9 7	2 6 8	2 6 9	2 6 4
3 4 8	4 3 5	5 3 8	6 3 4	7 3 9	8 7 4	9 8 3

This attempt meets two of the three requirements: each of the 28 blocks contains the numbers 1 to 9, and each of the seven columns contains the 36 pairs in 9. Unfortunately, eight of the 84 *threes* in 9 are duplicated (those in parentheses), and eight are missing: 1 5 6, 1 8 9, 2 4 8, 2 5 6, 4 5 7, 4 5 8, 4 6 9 and 6 7 8.
That's as far as I can get without a computer. The problems that remain are: can it be done? (that interests me most) and if not, why not?

On p.753 I blithely mentioned "when we get to blocks of 25, 49, 121 and so on". We won't be getting that far this time. But since my masterpiece in prestressed concrete verse, *Gnomenclutter: or Thirty-One Hexagonies of James Joyce*, is based on (5 x 5) + 5 + 1 = 31, I should at least show you how that works. This time the six blocks of 25, which give all the pairs in 25, are in this typeface, and the extra six, which take it up to all the pairs in 31, are in bold.

1 2 3 4 5 **26**	1 6 11 16 21 **27**	1 7 13 19 25 **28**
6 7 8 9 10 **26**	2 7 12 17 22 **27**	2 8 14 20 21 **28**
11 12 13 14 15 **26**	3 8 13 18 23 **27**	3 9 15 16 22 **28**
16 17 18 19 20 **26**	4 9 14 19 24 **27**	4 10 11 17 23 **28**
21 22 23 24 25 **26**	5 10 15 20 25 **27**	5 6 12 18 24 **28**
1 8 15 17 24 **29**	1 9 12 20 23 **30**	1 10 14 18 22 **31**
2 9 11 18 25 **29**	2 10 13 16 24 **30**	2 6 15 19 23 **31**
3 10 12 19 21 **29**	3 6 14 17 25 **30**	3 7 11 20 24 **31**
4 6 13 20 22 **29**	4 7 15 18 21 **30**	4 8 12 16 25 **31**
5 7 14 16 23 **29**	5 8 11 19 22 **30**	5 9 13 17 21 **31**
		26 27 28 29 30 31

The mandatory pattern

1 2 *n*	1 2 3	1 2 4	1 2 5	1 2 6	1 2 7	1 2 8	1 2 9
f a p							
l o x							
1 *f l*	1	1	1	1	1	1	1
2 *a o*	2	2	2	2	2	2	2
n p x	3	4	5	6	7	8	9
1 *p o*	1	1	1	1	1	1	1
2 *f x*	2	2	2	2	2	2	2
n a l	3	4	5	6	7	8	9
1 *a x*	1	1	1	1	1	1	1
2 *p l*	2	2	2	2	2	2	2
n f o	3	4	5	6	7	8	9

The letters *n f a p l o x* represent the numbers 3 to 9, in no particular sequence

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The threes in 9 (excluding the seven used in the mandatory pattern)

1 3 4	2 3 4					
1 3 5	2 3 5					
1 3 6	2 3 6					
1 3 7	2 3 7					
1 3 8	2 3 8					
1 3 9	2 3 9					
1 4 5	2 4 5	3 4 5				
1 4 6	2 4 6	3 4 6				
1 4 7	2 4 7	3 4 7				
1 4 8	2 4 8	3 4 8				
1 4 9	2 4 9	3 4 9				
1 5 6	2 5 6	3 5 6	4 5 6			
1 5 7	2 5 7	3 5 7	4 5 7			
1 5 8	2 5 8	3 5 8	4 5 8			
1 5 9	2 5 9	3 5 9	4 5 9			
1 6 7	2 6 7	3 6 7	4 6 7	5 6 7		
1 6 8	2 6 8	3 6 8	4 6 8	5 6 8		
1 6 9	2 6 9	3 6 9	4 6 9	5 6 9		
1 7 8	2 7 8	3 7 8	4 7 8	5 7 8	6 7 8	
1 7 9	2 7 9	3 7 9	4 7 9	5 7 9	6 7 9	
1 8 9	2 8 9	3 8 9	4 8 9	5 8 9	6 8 9	7 8 9

• • • FINALLY: Sally and I hope to move again soon. Please regard PO Box 80, West Brunswick, Victoria 3055 as our permanent Melbourne postal address, no matter where we get to. Bundoora is OK until April 1989. Cheers! JB

The University of Melbourne

POSTSCRIPT TO THE ANZAPA EDITION OF PHILOSOPHICAL GAS 74

My apologies for the dreadful photocopying. I had intended to have Philosophical Gas 74 copied, or perhaps even printed, by someone in the business, but time ran out. Today is Easter Tuesday in Melbourne, and Gerald sounded rather definite about that 7 April deadline, which is the day after tomorrow from where I sit.

As some sort of consolation, I can tell you that what has become known in some circles as "the Bangsund Conjecture" (the Problem of the Perfect Nine, I called it on p.754) is in fact capable of demonstration.

If you are interested (I don't blame you if you aren't; Sally didn't think much of this issue at all after the first couple of pages), my "mandatory pattern" is a little misleading, and in fact you won't get far if you stay with the 1 2 3/4 5 6/ 7 8 9 pattern. Try instead 1 2 3 / 4 5 7 / 8 9 6. The solution, once you grasp it, is stunningly simple. It's rather ironic that, having grappled with the problem for nearly two years, and putting a lot of thought into presenting it in PG, I'm just about to go to press and a friend rings me with what he thinks might be the answer. And it was.

Now, I'll just have a word with the photocopier suppliers about the care and feeding of their machines, on account of this one has just stopped with several pages (x 30) to go, and I'll meet you all again in June, Lord willing and weather permitting.

Cheers!

JhB.

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