

C O M B I N A T O R I C S

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COMBINATORIAL MATHEMATICS SOCIETY OF AUSTRALASIA

DIRECTOR'S REPORT FOR 1983

The total membership of the Society remains at about 100. This number has been arrived at by treating all those who attended either the 1982 conference or the 1983 conference or both as members. There are also many who did not attend either meeting but who were financial members in 1982 or 1983. Those who have not paid dues since 1981 have been taken off the membership list.

At the XIth ACCM there are 50 participants of whom 44 are presenting papers. There are 7 invited speakers. This is the first time the venue has not been in Australia and it is most gratifying to see how little a change in geography affects the total attendance. It seems that the enthusiasm of members will carry them to places afar regardless of expense.

I am pleased to record gratitude to the following in providing assistance for the XIth ACCM:

The Australian Mathematical Society,
The New Zealand Mathematical Society,
The Mathematics Department, the University of Canterbury,
The Economics Department, the University of Canterbury,
The Dean of Science, the University of Canterbury,
The Department of Extension Studies, the University of Canterbury,
The Westpac Banking Corporation,
The Bank of New Zealand,
and an unknown person who abandoned in the gutter a \$2 bill which was unsuccessfully invested in a lottery.

The financing of the conference has been under two threats during the past year. The first was the possibility that the price freeze might be lifted. Fortunately this has not happened. The second was the prospect of a sharp adjustment in international exchange rates. To guard against this only a portion of the Society's funds was transferred to New Zealand and this transfer took place after New Zealand had devalued.

Springer-Verlag wrote on July 13, 1983 to say that they will not be able to do the proceedings for the XIth ACCM. I have since written to Professor Peter L. Hammer about the proceedings appearing in the Annals of Discrete Mathematics. I am awaiting a reply from him.

Finally I would like to thank my colleagues D.F. Robinson, L.R. Foulds and G.R. Wood for their help in running the conference. Dr D.F. Robinson will be editing the proceedings. Also I would like to thank the secretaries of the Mathematics Department of the University of Canterbury for the amount of time spent on typing, addressing and assembling.

D.R. Breach
September 1983.

COMBINATORIAL MATHEMATICS SOCIETY OF AUSTRALASIAFINANCIAL STATEMENT (Adelaide 1982-1983)

		\$
<u>Opening Balance</u>		
(from Brisbane)		1112.00
<u>Receipts</u>		
Membership Subscriptions	306.00	
Donations	2200.00 *	
Interest	78.61	
Conference: Registration	1342.50	
Excursions	140.00	
Dinners	660.00	
Accommodation Deposits	300.00	
		5027.11
		6139.11
<u>Expenditure</u>		
Conference: Excursion	140.00	
Accommodation	1111.50	
Catering	285.00	
Dinner	666.00	
Name Tags, receipt books, etc.	24.04	
Invited Speakers	1050.00	
Office Assistance	50.00	
Refund to Brisbane	37.61	
Production cost of proceedings	634.80	
N.Z. Conference Contribution	531.56	
		- 4530.51
Surplus		1608.60

* Includes Springer-Verlag contribution towards cost of the Brisbane proceedings

M. Sved
L.R.A. Casse

Auditor's Statement:

I have examined the accounts and verified that they represent a true and fair view of the financial affairs of the Society.

R.M. Cornish
26/8/83

MINUTES OF THE ANNUAL GENERAL MEETING OF THE COMBINATORIAL MATHEMATICS SOCIETY OF AUSTRALASIA, ON 1 SEPTEMBER 1983, AT THE UNIVERSITY OF CANTERBURY, CHRISTCHURCH, NEW ZEALAND.

PRESENT: Dr. D. R. Breach, the Director of the Society, and about thirty members.

1. APOLOGIES: Professor B. H. Newmann, Professor and Mrs. G. Szekeres, Dr. C. Praeger.

2. MINUTES OF THE PREVIOUS MEETING:

These had been circulated and were received.

3. MATTERS ARISING:

Dr. Casse reported that the meeting between himself and members of the A.M.S. committee to discuss affiliation between the CMSA to the A.M.S. had not taken place.

Moved That the incoming Director look into the matter of affiliation to the A.M.S. CARRIED.

4. FINANCIAL

The financial report of the 1982 conference was received. Not allowed for was an anticipated contribution from Springer Verlag towards the cost of producing the proceedings of the 1982 conference. About \$800 might be expected.

5. DIRECTOR'S REPORT

Proceedings

Despite earlier indications that they would publish the Proceedings, Springer Verlag had indicated in July that they would not do so. Peter Hammer and Ralph Stanton had earlier expressed interest, and the latter (who was present) had now submitted a written offer. It had not proved possible to contact Peter Hammer. The secretary of the meeting read Professor Stanton's offer, which was elucidated by further questions. Under this arrangement the Proceedings would appear as a special volume of Ars Combinatoria.

Moved That Professor Stanton's offer be accepted. CARRIED.

6. VENUE FOR 1984 CONFERENCE

The University of Western Australia, Perth, with probable dates 13-17 August was confirmed.

7. VENUE FOR 1985 CONFERENCE

It was suggested that it was Sydney's turn, and this was generally agreeable,

8. DIRECTOR FOR 1984

Dr. Cheryl Praeger was elected.

9. CHANGE OF NAME

Following the carrying of a name-change by a very small vote at the 1982 Conference, the Director felt that it ought to be confirmed by this meeting, or otherwise.

Moved from the Chair: That the name of the conference be changed by adding "and computing".

CARRIED

Moved: That "Australian" be replaced by "Australasian".

CARRIED

Note: The numbering is unchanged, so that the 1984 Conference will be "12th Australasian Conference on Combinatorial Mathematics and Computing".

10. OTHER BUSINESS

(a) Professor P. J. Lorimer announced that the Summer Research Institute of the Australian Mathematical Society in January 1985 would be held in Auckland. He enquired whether a section on combinatorics was wanted. About ten people indicated interest.

(b) Professor W. D. Wallis raised the question of action should Springer Verlag at this late stage decline to publish the Proceedings of the 1982 Conference.

Moved: That if Springer Verlag did not publish the 1982 Proceedings the Dr, Casse should send the manuscript to Professor Stanton, for publication as determined above for the 1983 Proceedings.

CARRIED

(c) A vote of thanks to Dr. D. R. Breach, and the other organisers of the Conference was carried by acclamation.

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Problems and Comments

- (i) In reply to the problem of the previous newsletter, do Kangaroos have upper and lower bounds?, St. John Kettle has communicated the following answer from a reclusive combinatorial theorist in Tennant Creek:

*'Tis clear as fresh beer to an Aussie true blue,
That the least upper bound of the average 'roo
(In average conditions - on average ground,
Pursued by an average Australian hound)
Is twenty one feet, or perhaps twenty two;
And the least upper bound of the whole bleeding lot,
Was made by a gray while avoiding my shot,
He cleared my land-cruiser with plenty to spare,
And (so far as I know) he is still in the air.'*

- (ii) St. J. Kettle asks: do duels have duals? or are duels self-dual? Discuss.

Editorial comment: Yes indeed duels could have duals and more. It depends upon the time and country where these affairs of honour took place. In France it was common for the seconds to engage in battle also. In the infamous *duel des mignons*, the principals were Quélus and d'Entragues with Riberac and Schomberg as seconds for d'Entragues and Maurigon and Livarot for Quélus. The principals had scarcely begun when Maurigon and Riberac also crossed swords. Then Schomberg said to Livarot "These gentlemen are fighting; what shall we do" Livarot replied "We cannot do better than maintain our honour;" and they too engaged.

In the duel in which the Duc de Beaufort killed his brother-in-law the Duc de Nemours, the Marquis de Villars as second engaged the other second d'Héricourt whom he had never met.

The duel between La Frette and de Chalais had not only fighting seconds but also thirds. To these were added fourths when the King's messenger Saint-Aignan, sent to stop the fight, agreed to join in the fight if he could be provided with an opponent.

And in England when Lord Mohun duelled with the Duke of Hamilton in 1712 their seconds Maccartney and Colonel Hamilton also fought. The principals were killed. The seconds were convicted of manslaughter.

Further comments are welcome.

- (iii) An open question: counting the generators of the Möbius network. Submitted by St. John Kettle, Department of Mathematics, Monash University.

For the reader who tires of designs, codes, and the like here is a problem which has a longer pedigree.

Let $p = \{A, B, C, \dots\}$ and $\ell = \{a, b, c, \dots\}$ denote the sets of points and lines respectively of a projective plane, and the AB and ab denote the line joining A, B and the meet of a, b respectively.

Define a nested sequence $s_0 \subset s_1 \subset s_2 \dots$ of sets consisting of points and lines as follows. s_0 is an arbitrary '4-point': i.e. s_0 consists of 4 points no 3 of which are colinear. For $i \geq 0$, let

$$s_{2i+1} = s_{2i} \cup \{ AB ; A, B \in s_{2i} \}$$

$$s_{2i+2} = s_{2i+1} \cup \{ ab ; a, b \in s_{2i+1} \}.$$

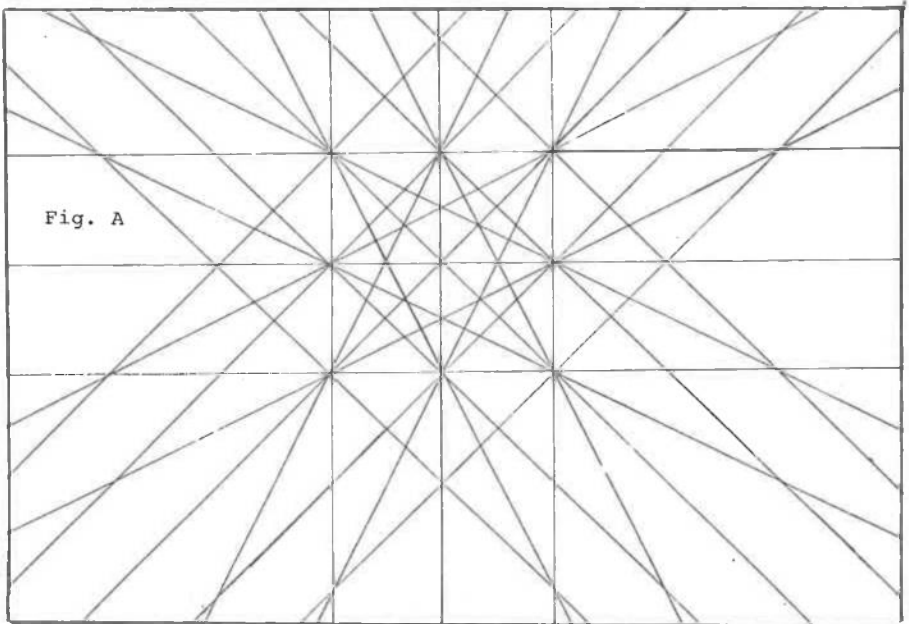
Question: Let $\#s$ denote the cardinality of the set S . Discuss the sequence $(\#s_0, \#s_1, \#s_2, \dots)$ for various projective planes.

A special case

Choose the plane to be the real projective plane, which may be identified with the Euclidean plane together with a 'line at ∞ '. The sets s_i generated from the 4-points consisting of the vertices of a square (A) and the vertices and centroid of an equilateral triangle (B) are shown in figures (A), (B). The reader may convince himself that if we set $t_i = \#s_i - \#s_{i-1}$, $i \geq 1$ and $t_0 = \#s_0$, then the first 7 terms of the sequence t are

$$(4, 6, 3, 3, 6, 16, 84).$$

Möbius showed that if we set $S = \bigcup_{i=0}^{\infty} s_i$, the set of points in S is dense in the plane, so certainly $\#s_i \rightarrow \infty$. Can you refine this statement?



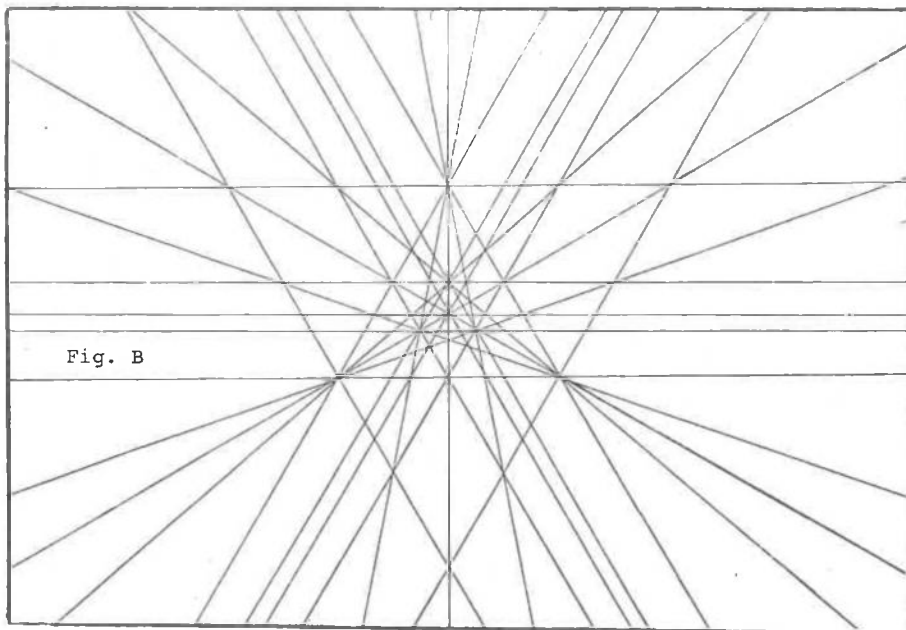


Fig. B

(iv) Problems of identity. Who are the people to whom these extracts refer? For the answers see next page.

Perhaps he was intolerant of everyone but philosophers, for the distinguished mathematician, Max Newman, who had several discussions with him, told me that once - when philosophy versus mathematics was at issue between them - he heard muttering under his breath, "You ought have been drowned at birth!"

from *Memories* by Frances Partridge,
1981.

My only pleasure in Church used to be calculating the date of Easter. You divide by 19, excluding fractions. It was such a relief to be able to do that. One was never allowed to exclude fractions in arithmetic at other times.

..... as quoted in
Personal Record 1920-1972
by Gerald Brennan.

Book Section

GEOMETRY and ALGEBRA in ANCIENT CIVILIZATIONS, by B.L. van der Waerden, Springer-Verlag. 1983, 240pp, US\$33.70 (approx).

Contents: Pythagorean triangles, Chinese and Babylonian Mathematics, Greek Algebra, Diaphantos and his predecessors, Diophantine equations, Pell's equation, Pythagorean triples, popular mathematics, general character of popular mathematics, Babylonian, Egyptian and early Greek problems, Greek arithmetical epigrams, mathematical papyri from Hellenistic Egypt, squaring the circle and circling the square, Heron of Alexandria, the mishnat ha-Middot, Liu Hui and Aryabhata.

Answers to (iv) of problems section:

Ludwig Wittgenstein; Bertrand Russell.