

Please send this report to the Secretary of the European Mechanics Council, Professor Bengt Lundberg, Dept of Mechanical Engineering, Luleå University of Technology, S-951 87 Luleå, Sweden, one month after the Colloquium

### General

Euromech Colloquium No: 283

Title: Mathematical Modelling of Liquid Crystals and Allied Systems.

Chairmen: Professor Frank Leslie

Place and country: University of Strathclyde, Glasgow, Scotland.

Dates: 16-19 July 1991.

### Finance

The conference fee £20 included Coffee and Tea

Funding: London Math. Soc. £500 Edinburgh Math. Soc. £200 Strathclyde Maths. Dept. £400

Accommodation (type and cost): University residence £16 per night bed and breakfast

Meals: Lunch £6, Dinner £7, Colloquium Dinner £15

### Participation

Total number of participants: 33

Distribution of participants by country:

<u>Code</u>	<u>Country</u>	<u>Number</u>	<u>Code</u>	<u>Country</u>	<u>Number</u>
A	Austria	<u>        </u>	I	Italy	<u>2</u>
B	Belgium	<u>        </u>	IRL	Ireland	<u>        </u>
BG	Bulgaria	<u>1</u>	N	Norway	<u>        </u>
CH	Switzerland	<u>        </u>	NL	Netherlands	<u>        </u>
CS	Czechoslovakia	<u>        </u>	P	Portugal	<u>        </u>
D	Germany	<u>7</u>	PL	Poland	<u>2</u>
DK	Denmark	<u>        </u>	R	Rumania	<u>1</u>
E	Spain	<u>3</u>	S	Sweden	<u>1</u>
F	France	<u>        </u>	SF	Finland	<u>        </u>
GB	Great Britain	<u>13</u>	YU	Yugoslavia	<u>        </u>
GR	Greece	<u>        </u>	SU	Soviet Union	<u>1</u>
H	Hungary	<u>        </u>	-	Others USA	<u>2</u>

Is there need of another colloquium on the same subject? Which year? Possibly in a few years.

## Scientific Report

Although the number attending was relatively low, 33 participants from ten countries, the portion actively participating was rather high, with two out of three presenting papers. Also the friendly informal nature of a small meeting led to good discussions both in the formal and informal sessions. Given the research interests in liquid crystal theory at Strathclyde, the greater part of the meeting concentrated upon aspects of continuum modelling of thermotropic liquid crystals and liquid crystalline polymers, four of the five sessions being devoted to these themes, while a fifth session considered statistical mechanical modelling.

The first morning session consisted of papers upon defects and domain walls in nematic, cholesteric and smectic liquid crystals, covering topics of current practical interest, turning after coffee to more complex issues in mathematical models for equilibrium situations. The second morning session on dynamical aspects of nematic theory included papers upon convective instabilities driven by electric fields, and flow induced instabilities, both enduring topics in this field, with the latter part of this session turning to two more recent interests, namely pattern formation in Freedericksz transitions and in polymeric materials. The final morning session was devoted to more general aspects of continuum modelling of liquid crystal behaviour beginning with a paper on general principles, which was followed by three papers from IU Berlin which raised questions concerning a recent generalisation of nematic theory by Ericksen, proposed essentially to model defects more satisfactorily.

The first afternoon session was devoted to microscopic modelling beginning with a statistical mechanical derivation of nematic viscosities, Dr. Rajesh unfortunately being unable to attend. This was followed by papers on anchoring transitions, binary mixtures and polymeric materials. The other afternoon session considered applications of liquid crystals in displays, and not surprisingly dealt with optical properties of ferroelectric liquid crystals, including discussions of the observed chevron structures that occur in these materials.

The conference was successful in bringing together a number of groups with different backgrounds but common interests, and creating a forum that gave an opportunity to improve understanding of their various aims and objectives. For this it was clearly necessary to create a suitable friendly atmosphere, and the informal nature of a small meeting in pleasant surroundings on the campus of Strathclyde University proved ideal, with individuals from different disciplines and countries coming together to become better acquainted with one another and various scientific methodologies. In this respect the highlight of the social programme was a whisky tasting session courtesy of Bowmore Distillers, which rounded off a very convivial Colloquium Dinner.

J. M. L. L.

23 October 91.