BSDB Newsletter

No. 18

Autumn 1988

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This Newsletter was produced using the Society's new Apple Macintosh computer with the PageMaker desktop publishing system. This should enable me to produce a more professional-looking document which will allow members to glean the information they need more quickly and perhaps even more pleasurably. If anyone has suggestions for further improving the Newsletter, please let me know.

Jim Smith, Publications Secretary.

CONTENTS

FUTURE BSDB MEETINGS
Spring 1989, St Andrews

The Spring 1989 meeting will be held in St Andrews on April 3rd-6th. As usual this will be a joint meeting with the British Society for Cell Biology. A poster advertising the meeting accompanies this Newsletter: please display it in your department. The topic of the BSDB Symposium is **The Molecular Basis of Morphogenetic Signalling.** The organizers, Rob Kay and Jim Smith, write:

In the last few years we have had our first glimpses of the molecular mechanisms that might underlie the generation of spatial patterns of cells during development. The heart of the problem is to understand the signalling systems that communicate positional information. We want to know the nature of the molecules (morphogens) that signal between cells or nuclei, the dynamics of the signalling system and how the signals affect the cells. Knowledge of morphogens is coming from work on a number of organisms and from at least two major strategies: molecular genetics (as in *Drosophila*) and cell biology (as in *Xenopus* and *Dictyostelium*). The objective of this meeting is to bring together these different approaches to promote the search for common themes which we all expect to be present at some level.

Other sessions at this meeting are organized by the Scottish Developmental Biology Group. The topics are **Sex determination** and **Growth factors**. The BSCB Symposium is on the **Cell cycle**. Other BSCB sessions include **Proteolytic mechanisms**, **Alternative splicing**, **Glycosaminoglycans**, and **G-proteins**. There will also be a workshop on **New Developments in microscopy** organized by Brad Amos (Cambridge). The timetable for this meeting is outlined on the next page, with speakers' titles where available.

The Molecular Basis of Positional Signalling

Tuesday 4th April

9:00 **P. Nurse** (Oxford; BSCB Plenary speaker)

BSDB Sessions

10:10 **R. Kay** (Cambridge; Welcome and introductory remarks)
Chair: **J. Cooke** (London)
10:15 **L. Wolpert** (London) Positional Information Revisited
10:50 *Coffee*
11:20 **R. Lehmann** (MIT) *Drosophila* posterior pole plasm
12:00 **H. Jäckle** (Munich)
12:40 *Lunch*
2:00 **D. Melton** (Harvard)
2:40 **J. Gerhart** (Berkeley) Cortical rotation in the *Xenopus* egg
3:20 *Tea*
Chair: **D. Ish-Horowicz** (Oxford)
3:50 **W. Gelbart** (Harvard) *Decapentaplegic* and *Drosophila* morphogenesis
4:30 **J. Austin** (Madison) Genetics of intercellular signalling in *C. Elegans*
5:10 To be decided
6:00 *Dinner*
7:30 **A. Tomlinson** (Cambridge)
8:10 **P. Ingham** (Oxford) Role of local interactions in *Drosophila* pattern formation

Wednesday 5th April

Chair: **D. Garrod** (Southampton)
9:00 **P. Devreotes** (Baltimore)
9:40 **R. Kay** (Cambridge) Morphogenetic signalling in *Dictyostelium*
10:15 **J. Williams** (ICRF, Clare Hall) Two pathways of stalk cell differentiation
10:50 *Coffee*
11:15 **C. Schaller** (Heidelberg) Morphogens and pattern formation in Hydra
12:00 **BSDB Plenary Lecture: C. Nüsslein-Volhard** (Tübingen; Chair: **L. Wolpert**)
1:00 *Lunch*
Chair: **N. Holder** (London)
2:30 **M. Maden** (London)
3:10 **G. Eichele** (Harvard Medical School)
3:50 *Tea*
4:20 **H. Meinhardt** (Tübingen) Models for positional signalling in relation to available observations
5:30 BSDB AGM
6:00 BSCB AGM

Thursday 6th April

9:00 **B. Alberts** (San Francisco: BSCB Plenary speaker)

BSDB Sessions

	POSITIONAL SIGNALLING		**SEX DETERMINATION**
	Chair: **P. Lawrence** (Cambridge)		
10:10	**J. Smith** (London)	XTC-MIF & mesoderm induction	**A. Spence** (Cambridge)
10:50	*Coffee*		
11:20	**J. Slack** (Oxford)	FGF & mesoderm induction	**M. Bownes** (Edinburgh)

12:00	**A. McMahon** (New Jersey)	**M. Ferguson** (Manchester)
12:40	**P. Lawrence** (Cambridge)	**P. Goodfellow** (London)
1:00	*Lunch and end of positional signalling sessions*	
		GROWTH FACTORS
2:30		
3:10		
3:50		*Tea*
4:20		
5:00		
5:40		*End of meeting*

The BSCB **Cell Cycle** sessions are organized by Tim Hunt, Paul Fantes, Rob Brooks and Denys Wheatley. The timetable was not available as this Newsletter went to press, but the speakers include: B. Alberts (San Francisco; Glaxo Plenary Lecturer), D. Beach (Cold Spring Harbor), K. Bloom (Chapel Hill), J. Blow (Cambridge), F. Cross (Seattle), M. Dorée (Montpellier), M. Fairman (Cold Spring Harbor), D. Glover (London), L. Hartwell (Seattle), T. Hunt (Cambridge), E. Hurt (Heidelberg), C. Hutchison (Sussex), E. Karsenti (Heidelberg), J. Kilmartin (Cambridge), J. Maller (Denver), T. Mitchison (San Francisco), J. Newport (La Jolla), P. Nurse (Oxford; Plenary Lecturer), S. Reid (La Jolla), J. Roberts (Seattle), G. Sluder (Shrewsbury), M. Whitaker (London) and M. Yanagida (Kyoto).

ADVICE TO DELEGATES

The information presented below by John Tucker, the local organizer, should help you identify your requirements and complete the registration form. There are some other items which will help you to plan ahead and avoid inconvenience and disappointment.

TRAVEL

To save time, money and inconvenience, early booking of travel arrangements is strongly recommended.

Rail

Registrants will be sent a form to qualify for the special Conference fare, but note that a Saver Ticket may be slightly cheaper depending on your route and schedule. There is a sleeper train which runs direct from Euston (but King's Cross for day-time trains usually) to Leuchars and this avoids being deposited on a Edinburgh platform at an early hour. Sleepers need to be reserved at least 2 weeks in advance. Leuchars Station is 5 miles from St. Andrews. A few taxis meet trains and the bus stop (1 hourly service) is 300 metres from the station. Coaches and minibuses will convey you to your Hall of Residence if you arrive 14.00-22.00 on Monday 3rd and return you to the station on the afternoon of Thursday 6th provided you book this facility on the Booking Form. There are only a few trains which run right through to Leuchars from London (currently 06.05, 13.00, 16.00 arriving 12.28, 18.44, 21.38 respectively). It is worth aiming for such trains (and booking a seat) to avoid the potential delay if you change trains at Edinburgh during the period 16.00-18.00 when the capacity of the hourly local service may be inadequate. There are bars, cafeterias and restaurants at Waverly Station but Haymarket Station (if you approach from the west) lacks facilities

(so press on to Waverly if your connection is not tight and you anticipate a wait). At present a 16.19 train leaves Leuchars in the afternoons to reach London at 20.22. Please check times because new time-tabling comes into effect before April but the general pattern will probably remain.

Air
At the moment the British Airways Shuttle return fare is £79 if purchased 2 weeks in advance of travel for off-peak flights only. Coach transport will meet the shuttle departing Heathrow at 14.00, arriving Turnhouse Airport (Edinburgh) at 15.10, to get you directly to your Hall of Residence before 17.00 provided you book this on the Booking Form. A coach will return you to the airport on Thursday 6th for the 15.00 shuttle (leaving at 13.00 so an early lunch is necessary if you are in this category).

MEALS AND ACCOMMODATION IN HALLS OF RESIDENCE
Please note that the package provided by the Full Booking offer is at a reduced overall rate compared with booking items individually. This package is available with or without the Conference Dinner. If bed and breakfast for the night of Thursday 6th is required then this should be booked as a separate additional item. You will need to make your own arrangements for dinner on the Thursday evening and it may be necessary for delegates to transfer to another Hall of Residence for this extra night. The number of double rooms is limited and will be allocated on a first booked - first served basis.

All meals (Conference Dinner excepted) wil be served in Halls of Residence which are close to the Physics and Chemistry buildings where all the scientific sessions will be held.

Eating Out
So far as lunch is concerned bear in mind that pubs and restaurants are situated in the town about 10 to 15 minutes brisk walk away from the lecture theatres.

Conference Dinner
The Conference Dinner will be held at the 'Craw's Nest' Hotel in the fishing village of Anstruther on the south Fife coast (about 10 miles from St. Andrews). The hotel overlooks the Firth of Forth and the Isle of May. A four course meal with wine and coffee, plus coach transport, are included in the cost.

Whisky Tasting
This is planned for 8 p.m. on Monday evening, so try to arrive in time.

Golf
Clubs can be hired and 3 of the courses can usually be played just by turning up (see the Starter the day before if possible). All courses can be booked by post. There is no advance booking for Saturdays. The Old (Championship) Course has to be booked in advance. Booking has already started for April, and the chances of success decrease as time passes but you might be lucky even if you waited until early March.

The Old Course is closed on Sundays and preference is given to those who also book play on one of the less popular courses. To book, specify when (give preferences), which courses and the number of players (The Secretary, St. Andrews Links Management Committee, Golf Place, St. Andrews, Fife KY16 9JA. Tel: 0334-75757). For the Old Course bring your handicap certificate, or a letter of introduction from your golf club, establishing your general competence.

Posters
Maximum size 3 x 3 feet mounted on

card so that they can be attached to display board using double-sided adhesive tabs supplied here (no pins please). If you wish to present a poster please enclose abstract on the proforma (in photo-ready form) supplied with the Newsletter and indicate on the abstract whether you wish to be considered for the poster competition (see Newsletter for details).

Travel Awards

Young members of the BSDB or BSCB (Honor Fell Awards) who wish to apply should contact Dr Mary Bownes or Dr Fiona Watt respectively.

Disabled Persons

It is regretted that the Halls of Residence and laboratories involved during the meeting pose severe problems for the disabled who should contact the local organiser concerning the feasibility of participation.

BSDB Poster Prize

All delegates at the St Andrews meeting are encouraged to present a poster, and as usual the society is offering a prize for the best poster submitted by a graduate student. The value of the prize has been increased to £100, so it's well worth making an effort! The posters do not have to be on the theme or topics of the Meeting, and if you want your poster to be considered for the prize please indicate this on the abstract form in the centre of the Newsletter.

The main criterion of the judges will be that the poster describes good science. The work should set out to ask an interesting and important question and use appropriate techniques in an attempt to answer it. Purely descriptive studies, whether anatomical or molecular, will not be ruled out of consideration, but the contribution of such work to the understanding of developmental mechanisms should be clearly stated. Importance will also be attached to succinctness and clarity of expression, but 'professional' presentation won't carry much weight, so don't worry if you haven't got access to desktop publishing facilities and a laser printer!

The winner of the prize will be announced at the Conference Dinner and in the Autumn Newsletter.

Winter 1989, Warwick

The second meeting of 1989 will be held at Warwick University on December 18-20. The topic is 'Cell Messengers at Fertilization' and the organizer is Michael Whitaker (London). This will be a joint meeting with the Society for the Study of Fertility. Full details will be published in the next Newsletter.

Spring 1990, Manchester

The 1990 Symposium Meeting will be held in Manchester on April 2-5. The topic is 'Imprinting' and the organizer is Marilyn Monk (London). Suggestions for half-day sessions at this meeting are welcome, and should be sent to the Meetings Secretary, Nigel Holder.

Autumn 1990, Cambridge

This meeting will be held on September 11-15. The topic is 'The Generation and Regeneration of the Nervous System' and the organizers are Roger Keynes (Cambridge) and Andrew Lumsden (London).

Spring 1991, Leeds

The 1991 Symposium Meeting will be held in Leeds, and the local organizer will be David Hames. The topic of the Meeting has not yet been decided, and Members are encouraged to send suggestions to Nigel Holder (Meetings Secretary) or Jim Smith (Publications Secretary). As a reminder, the Symposium Meetings over the last five years have concerned 'Segmentation', 'The Mammalian Y Chromosome', 'Determinative Mechanisms', 'Early Amphibian Development' and 'Programmes for Development'. This year's meeting is on 'The Molecular Basis of Positional Signalling' and next year's is on 'Imprinting'.

ANNOUNCEMENTS

Travel Grants

We have now increased the amount available for travel grants to £2,500. Applications should be from BSDB members who are students or postdocs. Priority is as follows: (1) Ph.D. students to attend BSDB meetings; (2) Ph.D. students to travel to other meetings; (3) Postdocs to attend BSDB meetings; (4) Postdocs to attend other meetings.

Applications should include the details of the meetings, the cost, details of any other support applied for, a note of your salary and a letter of support from your supervisor and should be sent to Dr. Mary Bownes, Department of Molecular Biology, King's Buildings, Mayfield Road, Edinburgh, EH9 3JR.

The Committee

Ken Giles, who was elected to the Committee in 1987, has resigned because he is taking up a new position in Canada. We are grateful to Ken for his work for the Society, and wish him good luck and success in his new position.

We are also grateful to Hugh Woodland for all his work for the Society. Hugh is due to retire from the Committee soon.

The departure of Ken and Hugh means that there are now two vacancies on the Committee. Nominations should be sent to Peter Thorogood

The Constitution of the Society states that the Officers should be re-elected each year at the Annual General Meeting. The Officers are listed below; all are willing to stand for another year:
Peter Thorogood (Secretary)
Mary Bownes (Treasurer)
Nigel Holder (Meetings Secretary)
Jim Smith (Publications Secretary)
Karen Jacques (Graduate Rep)

Bristol

The success of the Bristol meeting was due in no small part to the hard work and efficiency of the local organizer, Beverly Randle, to whom we are all very grateful.

Development

One of the advantages of membership of the BSDB is a reduced subscription to **Development**. The usual price for individual subcribers this year is £90, but BSDB members pay only £60. This price includes the proceedings of the St Andrews Symposium on 'The Molecular Basis of Positional Signalling'. To make it simple to subscribe the centre section of this Newsletter includes a subscription form.

AGM

The Annual General Meeting of the Society will be held in St Andrews on Wednesday 5th April at 5:30 pm. The agenda will include a proposal to change the Constitution such that members taking early retirement and taking up no other paid position qualify for free life membership. This motion requires two thirds of those present to vote in its favour. If you wish to have your views expressed at the meeting but cannot be there, please write to Mary Bownes.

UGC Response

The following statement represents the response of the British Society for Developmental Biology to the UGC consultative paper on 'The Next Research Selectivity Exercise'.

The BSDB is pleased to note that the UGC, having decided to undertake a second exercise to assess reasearch effectiveness, acknowledges the extreme difficulty it has devising a set of objective parameters by which to achieve the task satisfactorily. The Society considers that such a statement should be included clearly in the preamble to any Report arising from such an exercise.

There are several conclusions drawn in circular letter 15/88 13/84/010 on which the Society wishes to comment.

1. **Anonymity of external referees (paras. 7,8 et. seq.)**

The experience of our members, acting both as anonymous referees or as the subjects of such referees' reports, has taught us that such a subjective input to decisions as critical as those to be made by the UGC is undesirable and certainly should not be made anonymously. Anonymity is too frequently a cloak for incomplete or dated knowledge, prejudices about people, institutions or particular scientific disciplines, and for partiality, especially where competitive or collaborative interests are involved, however remotely.

The Society believes that all evidence from referees or Committee members used as 'considered or informed professional opinion' should be attributed, and should be made available to the Cost Centre concerned with a right of reply.

2. **Composition of Review Committees.**

Review sub-Committees should always have at least one member from the subject area under consideration

3. **Nature of external referees.**

If the aim of the UGC is to collect unbioased opinions of the excellence and international standing of research activities, overseas external referees should be used. These referees should be sent the information made available to the UGC by the relevant Cost Centre.

4. **Nature of Cost Centre.**

The problem that the UGC must face is that traditional Departmental structures do not correspond to current intellectural

research disciplines. This is particularly well illustrated for Developmental Biology, an expanding scientific discipline carried out in Departments that include Anatomy, Biochemistry, Botany, Genetics, Molecular Biology, Physiology and Zoology. There are two main consequences of this research diversity for the UGC review. First, few individual Committee members and referees will be competent to assess all or even most of the varied research work carried out in one institution. Hence the extreme caution with which 'opinion' should be used as evidence (see point 1 above). Second, the varied sub-disciplines studied within a single Cost Centre may also vary in their excellence. In the last review, minority work of excellence in one sub-discipline was either overlooked or, even if acknowledged, was not adequately protected from the consequences of weakness in other sub-disciplines in the same Department. Newly expanding sub-disciplines such as Developmental Biology are particularly prey to negative discrimination in this way. Nothing in the circular leads us to feel confident that the UGC have grappled effectively with this problem.

5. Role for Professional Bodies and Societies

Because of the problems generated by the multi-disciplinary nature of many Cost Centres, specialist Societies are particularly well placed to offer constructive advice on procedures or on the usefulness of collected data and the UGC should avail itself of such advice.

6. Information to be requested.

The selection of only limited published material for submission is not appropriate. A total return for each Department of all published material under the following headings should be sought (i) Written Books (ii) Edited Books (iii) Refereed Full-Length Papers (iv) Full-Length Reviews (v) Papers Arising from Conference Proceedings (vi) Mini-Reviews. It should specifically be stated that abstracts are not required.It would also be useful to give a profile of the total academic staff in any one Cost Centre, perhaps in three groups: (i) inactive in research ov er the period under review, (ii) active and publishing, but with only a small grant income e,g, less than £10,000 per annum, (iii) active with grants in excess of £10,000 per annum.

7. Descriptions.

The use of a scale that relates Cost Centres to an 'average' is not appropriate since 'below average' was taken to mean, but is not the same as, 'unsatisfactory'. Classification of Cost Centres as 'distinguished', 'satisfactory' or 'unsatisfactory' could bring more objective, non-relative, standards to bear on the evaluation. In many disciplines, no Department could be considered 'unsatisfactory' by international standards even if 'below average' by British standards.

8. Assessors

The views of the major Charitable Trusts funding research should be sought, not just Research Councils.

9. Availability of Studentships

The UGC should bear in mind (para. 12) that the number of Research Council studentships available competitively to different Cost Centres is very different, and it would be more appropriate to record the success of a Cost Centre in attracting studentships as a proportion of those available to it rather than as an absolute number. For example, many Anatomy, Physiology and Pathology Departments are eligible only for MRC studentships whilst Biochemistry and

Zoology Departments receive MRC, SERC and/or NERC studentships.

10. **Appeals.**

Paragraph 34 is limp and unconvincing. Despite the protestations of the UGC, the ranking of Cost Centres was used negatively. It is therefore important that any potentially disadvantageous ranking should be genuinely warranted. Any Cost Centre likely to be ranked as 'below average' or 'unsatisfactory' should (a) be site visited, and (b) have the right of appeal. It would be possible to surcharge a University for any unsuccessful appeal so as to discourage frivolous applications.

In conclusion, the Society agrees with the UGC that the procedures proposed for the Research Selectivity Exercise are imperfect, that as a result the evaluations produced witll be flawed, and that in consequence, and as occurred last time, considerable injustice will results. The evaluation of research via the Research Granting Bodies is the appropriate way for this exercise to be caried out. The Society is of the view that that UGC exercise is unduly centralised and bureaucractic, is costly of time and money and that it is unnecessary in view of the existing 'free-market' review involved in making Grant applications. The UGC would be better advised to transfer its research evaluation and funding to the Research Councils.

DAVID NEWTH

10 October 1921 - 5 June 1988

David Newth, who died suddenly at the beginning of June this year, played a key role not only in the foundation of the British Society for Developmental Biology but also in establishing the Journal of Embryology and Experimental Morphology (now Development). The journal, first under the editorship of Michael Abercrombie and then of David Newth, quickly attained an international reputation among cell and developmental biologists. From its inception JEEM was closely associated with a series of conferences which drew together embryologists from many countries. Older members of the BSDB will recall the intellectual stimulus that these meetings provided and the life-long professional contacts and friendships which ensued. David Newth's contribution in this area was incalculable. He was actively involved with the BSDB from the start and it was most fitting that he became its first president in 1979, some 20 years after its foundation.

Soon after graduation in 1942 David Newth's academic studies at University College, London, were interrupted by war service with the Royal Electrical and Mechanical Engineers. This was a period not without incident but he rarely talked about his active service. From 1947 to 1960 he was a member of the Department of Zoology at his old College and it was during these years that his strengths both as a teacher and research worker, particularly in the area of developmental biology, became apparent. In 1960 he was appointed to the chair of Biology as Applied to Medicine at the Middlesex Hospital Medical School and five years later he became Regius Professor of Zoology at the University of Glasgow. During the time of his senior appointments he was much involved in the demanding task of restructuring both departments and inevitably (such was his nature) played an increasing role in administration, almost certainly to the

detriment of his personal research interests. As a head of department he showed considerable organisational ability and natural management skills; above all his concern, particularly for younger members of staff at all levels was often remarked upon.

David Newth's earlier research was concerned with the neural crest and later, in the 1950's, he initiated an attempt to turn white axolotl into black by injecting purified DNA into eggs and early embryonic stages. Characteristically David worked with a small research group and played a full part in the bench work. Both fields of research have since become, some 20 years later, areas of considerable interest to cell and developmental biologists.

Appreciations of David's life and work have appeared in the national press. Written by colleagues who knew him well they clearly reflect the respect and admiration of all those who came into contact with him during his professional life. They detail not only his commitment to Developmental Biology but also point to a much broader interest in zoology and his concern for the environment; he served as president of the Scottish Marine Biological Society and was a member of the Nature Conservancy Council. His sudden retirement through ill-health in 1981 came as a great shock to his many friends and colleagues.

Retirement enabled David to spend more time at Monevechadan. The house, situated in a somewhat remote glen to the west of Loch Lomond, is surrounded by a small area of woodland bounded by a mountain stream. David and his wife Jean obviously derived much pleasure in preserving this location and encouraging the indigenous wild life. Those fortunate enough to visit them were received with true kindness and courtesy. A visit was inevitably enlivened by David's stimulating conversation characterised by its gentle sense of humour, concern, as ever, for friends and former colleagues and his radical but always perceptive observations on contemporary affairs.

Frank Billet, October 1988

BOOK REVIEWS

Cellular and Molecular Bases of Biological Clocks: Models and Mechanisms for Circadian Timekeeping Leland N. Edmunds Jr. (Springer-Verlag, 1988, 530 pp, DM 158)

This book is a thorough and well-referenced review of its subject that brings together relevant information from a diverse range of disciplines from microbial genetics to neurophysiology. However it is a very specialist text. As the subtitle declares, the emphasis is on circadian rhythms and a mere five pages are devoted to developmental clocks. However, there is a large section on cell cycle clocks and the book contains material on a very diverse range of organisms so many BSDB members may find some items of interest.

The book is divided into six chapters. The Introduction is followed by a survey of circadian rhythms in eukaryotic microorganisms. Then follows a chapter on the cell cycle. Edmunds first looks at various models, mostly in relation to work done with yeasts *S. cerevisiae* and *S. pombe* and then goes on to cover the

CENTRE SECTION

This 'Centre Section' is designed to be removed without damaging the rest of the Newsletter. It contains a form for subscribing to **Development** (below), a membership application form, and a booking form for the St Andrews meeting

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Development

Members of the BSDB are entitled to a reduced subscription to **Development**. For £60 you will receive twelve normal issues and one casebound supplement. In 1989 the Supplement is **The molecular basis of positional signalling**, edited by Rob Kay and Jim Smith.

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To: **Development**
c/o The Biochemical Society Book Depot
P.O. Box 32
Commerce Way
COLCHESTER
Essex CO2 8HP
UK

Please enter my subscription to **Development**. I am a member of the BSDB, and undertake not to pass my subscription copies on to a library. I enclose a cheque for £60 made payable to the 'Biochemical Society Book Depot'.

Signature.....

Name.....

Address.....

.....

.....

APPLICATION FOR MEMBERSHIP

Full Name .....
Title ..... Degree(s) .....
Professional Address .....
.....
.....
.....
Post Code .....
Research interests .....
.....
.....

I wish to apply for ordinary (£10)/student (£5) membership of the Society (Delete as applicable)

Applications must be supported by two members of the Society, who should sign below:

.....

.....

Please return this form, together with the completed Banker's Order form below to the Secretary: Dr Peter Thorogood, Department of Biological Sciences, University of Southampton, Bassett Crescent East, Southampton SO9 3TU.

For Society's Use

Received	.....	Acknowledged	.....
Subscription	.....	Mailing list	.....
Elected	.....	Informed	.....

To: The Manager
.....(Bank)
.....
.....(Address)

Please pay to the British Society for Developmental Biology
Account No. 00867675
Barclays Bank Ltd, Oxford Circus Branch (20-64-88)
15 Great Portland St
LONDON W1N 6BX

the sum of £ (pounds) on 1st October, 1989 and on the same day each succeeding year unless this instruction is altered in writing by me.

Signature ..... Account No. .....
Name ..... Date .....
Address .....
.....
.....

Registration and Booking form

BSDB/BSCB SPRING MEETING

University of St Andrews, 3-6 April 1989

Name..... Sex.....

Address.....

.....

..... Telephone.....

Tick appropriate boxes. If you are an invited speaker, also tick here: ☐

Please read 'Advice to Delegates' before completing form

	Mon 3	Tues 4	Weds 5	Thurs 6	TOTALS
Full booking including conference dinner (Wednesday): £72.60					
Full booking with normal dinner on Wednesday: £62.00					
Bed & Breakfast including tea and coffee during meeting: £12.60					
Lunch: £3.85					
Dinner: £4.90					
Conference Dinner*: £15.50					
Minibus to & from Hall of Residence & Leuchars Rail Station: £2.50					
Coach to & from Hall of Residence & Turnhouse Airport (Edinburgh) for specified BA Shuttle: £8.00					
Registration. BSDB/BSCB members: £10.00; non-members: £25.00					
TOTAL					

Make cheques (£ Sterling) payable to 'The University of St Andrews 07.91.70.0'

*Book early for Conference Dinner: seating is limited to 300

If you prefer a double room, who would you like to share with?.....

Special requirements (eg vegetarian meals): .....

What is your position? Graduate student/Post-doc/Staff scientist/Other.....

If you wish to present a poster please enclose an abstract on the proforma supplied

Young members of the BSDB or BSCB who wish to apply for travel awards should apply to Dr Mary Bownes or Dr Fiona Watt, respectively

Completed forms, cheques and abstracts should be returned before 20th February, 1989 to the local organizer: Dr J.B. Tucker, Department of Biology and Pre-Clinical Medicine, Bute Building, The University, St Andrews, FIFE KY16 9TS, Scotland. Tel. 0334 76161 Ext 7230/7106

THIS FORM WILL BE RETURNED TO YOU. PLEASE BRING IT TO THE MEETING FOR ACCESS TO ALL MEALS AND LOCAL TRANSPORT

Poster abstract form

Please type your poster abstract in the box below. Begin with the title of the poster in CAPITAL letters, followed by the names and address of the authors in lower case. It would be helpful if the author(s) present at the meeting are indicated with an asterisk (*). Leave a blank line and then type your abstract. The abstracts will be reproduced slightly reduced, so if it is difficult to read full-size, it will be even more difficult in the abstract booklet! Please do not overlap the lines.

If you are a graduate student and wish to enter for the BSDB poster prize, please tick this box: ☐

relationship of the cell cycle to circadian oscillators. Chapter Four is entitled "Experimental approaches to circadian clock oscillators" and deals with the anatomical and biochemical investigations of circadian clocks. Included are both physiology (for example, the hypothalamus and pineal gland) and molecular genetics. The latter (such as the *per* gene of Drosophila) are well and clearly covered and seem to be reasonably up to date. The fifth chapter, on biochemical and molecular models, covers known metabolic oscillators but also includes possible transcriptional and membrane-based timers. Finally, Chapter Six deals with the evolution of clocks, the intriguing subject of clock pathology and therapy, and has relatively short sections on cellular clocks in development and ageing.

The writing style and level of this book are comparable to that of the rather better "Annual Reviews" articles. As a non-specialist I found the introductory paragraphs of most sections comprehensible and clear. However, what follows these tends to be much like a catalogue; the reference list at the back of the book runs to sixty pages! I did manage to identify two omissions. Circadian rhythms in humans are barely discussed; interesting work done in this country on melatonin rhythms and the use of melatonin therapeutically against jet-lag and seasonal depression are not even mentioned. Secondly, the periodically synthesised and degraded sea urchin protein cyclin which presumably plays a role in the cell-cycle clock (or at least is what the author would call a clock hand) is not touched upon. There are several typographical mistakes but otherwise the production is adequate, and there are plenty of diagrams.

In summary I would say that this book is a very useful source book particularly in the specialist lab and larger libraries. I suspect that for most developmental biologists "Cellular and Molecular Bases of Biological Clocks" will be more useful to know about than to own.

Jeremy Green
Laboratory of Embryogenesis, NIMR

Control of Cell Proliferation and Differentiation During Regeneration.

Monographs in Developmental Biology : Volume 21; ed. H. J. Anton (Karger, 1988; 246 pp, £100.50)

We all attend conferences and listen to some good talks, some not so good talks and some just plain terrible. But most importantly we meet colleagues, discuss ideas, think of earth-shattering experiments to do, set up collaborations and hopefully go home enthused and stimulated. Why then do we need to read conference proceedings, often published years later, of which there are far too many these days? Have you ever read a good one? They usually contain brief, unrefereed papers, some good, some not so good and some just plain terrible. Most of them would never get published in journals so why publish them at all? Conference proceedings should be banned, (BSDB Symposium volumes provide the honourable exception to this rule: ed.).

This monograph is a fine example of the genre. It is the proceedings of a regeneration colloquium held in Cologne in 1986 and contains papers on muscle regeneration, nerve regeneration, invertebrate regeneration, the regulation of limb regeneration and the control of proliferation during regeneration. There are 29 papers, 8 of which (28%) are by the editor, Ah Ah, now I see why the series is called MONOgraphs in Developmental Biology! Several of the papers report further results of work last described in the 1960's (what happened in

the 20 year gap, presumably nothing of any technical significance to Biology). Nevertheless there are some interesting snippets of information to be gleaned. For example, liver RNA put into the pond water of *Rana* larvae slows down tail regneeration by competing with the mRNA of the regeneration promotion factor. So *Xenopus* researchers for one could learn from this book, why bother to inject specific message sequences into specific blastomeres when you can just put it into the water? Perhaps this technique will take regeneration into the molecular age.

Please do not read this book, it is a bad advert for regeneration.

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A Theory of the Evolution of Development

W. Arthur (Wiley, 1988; £14.95)

Conventional neo-Darwinism, as exemplified for example by Richard Dawkins "The Blind Watchmaker", is confident that all evolution occurs by an accretion of small pehontypic steps and that all adaptive changes result from natural selection. Its practitioners will accept that there is a large amount of phenotypically silent evolution going on by random fixation of neutral mutations, but since these do not affect morphology they are considered only to be of interest to molecular biologists. Neo-Darwinists also seem to accept, at least in principle, that there are internal developmental constraints which restrict the range of viable mutational options and so may prohibit certain lines of change. What they will not countenance under any circumstances is evolutionary change by "big jumps".

Developmental biologists, on the other hand, tend to be rather fond of the big jump, since they are nurtured on the molecular genetics of *Drosophila* and think of mutations in developmentally significant genes as being homeotic in character. Of course they usually ignore the difficulty of establishing such changes in an existing wild type population. In this book Wallace Arthur has tried to apply some of the ideas of modern developmental biology to evolution to see whether the big jump can be made any more palatable to his colleagues. He attempts to simplify a given developmental program to what he calls a "morphogenetic tree" which is a sort of diagram of successive causes and effects. He then argues that mutations affecting early steps of the tree will have big morphological effects and those affecting the terminal branches rather minimal effect on final morphology. He offers us two ways of fixing such variants in the population: the morphological window and n-selection. These roughly correspond respectively to a rare advantageous macromutation and to a disadvantageous but viable mutation which becomes established in the absence of competition. He then gives an interesting comparison of his won ideas with those of Richard Goldschmidt, of "hopeful monster" fame. I cannot hope to convey the dept of these arguments in a short review, so those who are interested must read the book.

The major difficulty I had about the whole argument is the obvious fact that early stages of development can be radically changed without affecting the subsequent stages. A familiar example is the wide variety of arrangements of the extraembryonic membranes of mammalian embryos. Another might be the existence of both holoblastic and superficial cleavage among different members of the apterygota, both yielding an insect-like embryo at the germ band stage. The other major problem to my mind is that we really don't know enough about the

development of any organism to tell the evolutionary biologists anything that they would find interesting. This may change soon, as we can anticipate a fairly complete understanding of the developmental program of *Drosophila* within the next few years and it will then become possible to compare it with related insects and see what has really happened at the genetic level. My final misgiving is an uneasy feeling that however persuasive Wallace Arthur's arguments might seem, Richard Dawkins could have him for breakfast and hardly notice.

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Cell behaviour:shape, adhesion and motility.*J. Cell Sci* suppl 8, 1987. Ed. J.E.M.Heaysman, C.A.Middleton & F.M.Watt. (COB, Cambridge: £35.00).

This volume contains the proceedings of the Second Abercrombie Symposium held in Oxford in April 1987 and consists of 24 contributions which are divided into four sections. Most papers contain a brief review of the subject with new data included where available.

The first part, entitled "Modelling and analysing normal and malignant cell behaviour" deals with methods used to study cell motility and its relevance for metastasis and the maintenance of tissue structure. In recent years novel patterned substrata have been developed thanks to advances in the electronics industry necessary for microchip production. Ireland *et al.* have used surfaces bearing circular "islands"to control cell substrate area and hence shape. These have been used to examine the effects of shape constraint on focal contact distribution, microfilament organization and proliferative capacity of normal and transformed fibroblasts. Special substrates have also been used by Dow *et al.* to provide models for contact guidance *in vivo* using surfaces covered with steps, grooves or microhillocks on which cells align themselves in ways which appear to cause the least distortion of their cytoskeletons. They review recent work concerning neuronal cells grown on surfaces bearing microelectrode arrays for which direct measurements of electrical activities are already underway. Dow *et al.* also describe the use of microcomputors in cell tracking studies, an approach also taken by Dunn & Brown to analyse geometrical parameters of moving cells with a view to modelling cell movements mathematically, which may provide new insights into mechanisms of motility.

Mathematical models have been employed by Oster & Perelson in their consideration of the physical forces involved in the formation of cell protrusions; they propose that osmosis causes the formation of a bulge which can then be filled with a polymerised actin network. The role of microfilament and microtubule networks in cell morphogenesis is discussed by J. M. Vasiliev in a number of cell types and in situations leading to abberrant morphology e.g. TPA treatment.

Albert Harris suggests that motile forces of cells control and maintain anatomical structures in the adult animal as well as directing morphogenesis during development and that it is the correct balance of motile forces which is responsible for homeostasis rather than a lack of force in apparently stable structures. The reduction in traction forces after a cell transformation event makes this seem highly plausible. Ideas are illustrated particularly clearly using easily understood examples as analogies.
Marc Mareel *et al.* review tumour invasion assays and describes a new assay used to select invasive cells from locations within experimental tumours. Schor & Schor describe the motile phenotypes of adult, foetal and transformed fibrob-

lasts and the role of a migration stimulating factor in this phenomenon. Fibroblasts from the skin of cancer patients often display migratory characteristics resembling those of the foetal or the transformed cells and it is suggested that these may increase ones risk of developing cancer by their effect on normal epithelial-mesenchymal interactions. Molecular mechanisms of tumour invasion are reviewed by Roger Parish *et al.* who also present data on a new 37kd cell surface glycoprotein which they have identified in invasive fibrosarcoma cells whose function in invasion *in vitro* has been examined. P.C.Wilkinson discusses leucocyte migration in response to chemoattractants and the effect of the cell cycle upon the ability to migrate, and presents experimental work on the effect of tissue alignment on migratory response to attractants.

The second group of papers comprises a series of reviews on cell-substrate adhesion molecules by several leaders in the field. Buck & Horwitz review the rapidly advancing area of integrins and the molecules of cell-cell and cell-substrate adhesions are discussed in papers by Geiger *et al.* and Burridge *et al.*. Grinnell *et al.* describe the appearance of fibronectin receptors in keratinocytes in culture and their importance during wound healing with some evidence that fibronectin may have very useful clinical applications in promoting repair of damaged tissues. Finally, Hughes & Stamatoglu discuss cell adhesion in hepatocytes and the effects of different substrata on phenotype.

The section on cell shape and differentiation includes an excellent review by Ben-Ze'ev on the changes in expression of cytoskeletal proteins which accompany changes in cell shape and and substrate contact area. Fiona Watt discusses possible roles of shape and adhesion in keratinocyte terminal differentiation and Bissell & Barcellos-Hoff stress the role of extracellular matrix in directing cell behaviour with her theory of 'dynamic reciprocity': a cell plus its surrounding matrix is seen as a functional unit in which each is capable of exerting influence on the other.

The volume ends with five papers on cell behaviour during development which are mainly concerned with cell migrations or mechanical forces involved in morphogenesis. Donovan *et al.* have used the mouse primordial germ cell system to study cell migration in culture, particularly with respect to the extracellular matrix molecules they adhere to. Thorogood & Wood have studied cell movements more directly using time-lapse recordings of DIC images obtained from transparent fish embryos, while Morriss-Kay & Tuckett have injected lectin-labelled cells into live embryos to study the migration of neuroepithelial cells in rat forebrain development. Keller & Hardin have examined the mechanical forces involved in cell movement during gastrulation and Kucera & Monnet-Tschudi describe studies on the chick embryonic disc and concentrate on the importance of the extracellular-matrix to the mechanical forces generated.

This book successfully summarizes current thinking in a wide range of interests in both basic and applied research in the field of cell behaviour. The review-like nature of much of the content is complemented by descriptions of novel techniques and fresh data to allow this volume to fill the gap between a text-book and the very latest literature. The extensive reference lists will be useful to newcomers entering the field. Institute libraries or labs where cell behaviour is studied will find this a useful asset for several years to come.

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MEETING REPORT

The BSDB did not hold an Autumn meeting this year, but the BSCB meeting **Differentiation: New Perspectives** was of interest to many developmental biologists. Geoffrey Brown and Fiona McConnell of the University of Birmingham write:

Perspectives on the problem of biological differentiation were indeed provided by the broad treatment given at the BSCB Autumn meeting in Oxford. The study of the mechanisms generating different types of cell is increasingly concerned with events in the genome and their control, and a wide variety of cell systems serve as the material for such study. It is not naïve to suppose that the determination of lineage through the cellular regulation of differential gene expression will have a common basis in these systems. Therefore, by bringing together speakers working on the nematode (*Caenorhabditis*), sea urchin, amphibian (*Xenopus*), protozoan (*Dictyostelium*), and a variety of mammalian cell systems, the meeting provided an excellent forum for productive interaction.

As a preliminary to an outline of progress at the meeting, it is important to consider the fundamental questions motivating research in the field, questions which were generally assumed rather than explicitly dealt with in the presentation of material. The central problems are: What are the nuclear events determining whether cells choose a particular pathway of differentiation? How many choices are actually available at any given time? How is the control of cell proliferation linked to the capacity to differentiate? Answers to these questions depend on the combination of two complementary approaches adopted for the investigation of differentiation, both of which were well represented at the meeting. These are firstly, the use of simple cell systems and clever experimental design to test developmental models and secondly, the application of sophisticated genetic and molecular techniques to the analysis of gene regulatory factors.

The first of these approaches was most evident in the early sessions, which addressed the related matters of the choice of differentiation pathway and the factors associated with that choice, and was nicely exemplified by M.C. Raff's elegant work on glial progenitor cells. In the rat optic nerve, oligodendrocytes and type-2 astrocytes develop from a common bipotent progenitor cell (0-2A), but appear at different and discrete times with respect to the birth of the rat. The timing of oligodendrocyte differentiation is determined by a PDGF-like factor secreted by type-1 astrocytes, which are derived from a different progenitor. Type-2 astrocytes are induced by a 25 kDa protein which appears in the optic nerve 8-10 days later. The mechanism underlying the chronologically separate production of end cells from the common precursor may be a cell-division-counting clock, driven by the PDGF-like factor, or may depend on some other clock or internal programme.

A number of presentations in the first three sessions contributed to the issue of the expression of lineage potentials. Of central concern, as highlighted by M.F. Greaves in his discussion of cell lineages within the haemopoietic system, is the question of whether committed progenitor cells arise from multipotent stem cells in a stochastic manner, or appear in a

pre-determined sequence. Investigation of the accessibility of the genes associated with lineage-specific programmes suggests that several programmes can be accessible simultaneously. Further information on gene accessibility was given by H. Weintraub's experiments on the transfection of melanocytes with the myo-D gene, normally expressed only in skeletal muscle cell lines. In transfected melanocytes, both melanocyte and muscle programmes are expressed at the same time. Presumably myo-D is instrumental in providing access to muscle-specific genes. Similarly, H. Blau showed in another session that muscle genes are induced in heterokaryons produced by the fusion of muscle and non-muscle cells. The nuclei of the two cells remain separate, and the induction of muscle genes occurs in the non-muscle nucleus. Changes in chromatin structure associated with DNA replication appear to be unnecessary.

If a number of lineage programmes are accessible at any one time, the expression of individual lineage potentials in progenitor cells could be concomitant, random, or programmed sequentially. T.M. Dexter gave evidence from studies of pure populations of haemopoietic stem cells that the receptors for a number of growth factors are co-expressed. This result has important implications for the choice of differentiation pathways available at a given time, and for the deterministic function of micro-environments. Whether one, two, or more lineage potentials are co-expressed remains a controversial and interesting issue. Studies on non-vertebrate systems have revealed marker genes for ectoderm and mesoderm differentiation in the sea-urchin embryo (E.H. Davidson), various neuron cell fates in *Caenorhabditis elegans* (H.R. Horvitz), and pre-stalk and pre-spore development in *Dictyostelium* (J. Williams). This work may provide vital clues to the means by which cell lineages are developed and to the mechanisms regulating the timing and differential nature of gene expression.

The fourth and fifth sessions of the meeting demonstrated that one of the most active areas of interest in the field of differentiation is the involvement of cis- and trans-acting gene regulatory factors. R. Tjian described transcription regulating proteins in mammalian and *Drosophila* cells, an interesting feature of which is the presence of O-linked sugars (9 out of 12 factors), although the significance of the glycosylation is unclear. Tjian emphasized that factors can bind to a variety of promoter and enhancer elements; each gene contains multiple factor recognition sites. Specific patterns of gene expression may therefore result from the action of an appropriate combination of factors. Combination of factors was further dealt with by B.M. Spiegelman in his report on promoter activity in adipocyte differentiation. A c-fos-related protein (Fos), the transcription factor AP-1, and a regulatory gene sequence FSE2 form a nucleoprotein complex, in which both cis- and trans-acting components change during differentiation. J. Darnell showed that in the liver there are at least three different DNA-binding proteins that can bind to more than one gene, and may co-ordinate the cell-specific expression of genes. The co-ordinated action of cis- and trans-acting factors is certain to remain a most productive area of research in the next few years; however, an understanding of the regulation of their expression and activity is essential in resolving the mechanisms of determination.

The sixth session was concerned with cancer and the impairment of differentiation as one of the steps towards malignancy. H. Harris discussed results from the study of hybrids of malignant cells and diploid fibroblasts which showed that

the introduction of a complete terminal differentiation programme suppresses malignancy. Impaired differentiation was considered relevant in colorectal carcinoma cell lines, whose inability to attach to collagen type I may be responsible for the impairment (W. Bodmer). The importance of attachment is also seen in the haemopoietic system where stem-cell interactions with the stroma are essential to normal differentiation, and may be defective in chronic myeloid leukaemia. Further to the consideration of impaired differentiation, H. Green demonstrated that the proliferative capacity of keratinocytes is clonally distributed, and that the final clonal type, with the least proliferative potential, gives rise to terminally differentiated colonies. This relationship between the proliferative capacity of cells and their potential for terminal differentiation is crucial to the consideration of possible imbalances leading to malignancy.

The final session of the meeting was concerned with the use of transgenic mice as a means of studying differentiation. D. Solter demonstrated the importance of genes activated very early in development using results from experiments in which mouse zygote pronuclei were replaced with nuclei from cells from later embryonic stages; the replacement nuclei supported only one or two cell divisions. S.A. Camper discussed the repression of the alpha-fetoprotein gene in post-natal development, which is mediated through its proximal 5' region. H. Westphal used the mouse lens as a well-defined model for transgenic studies; targetting the gene for the polyoma large T antigen to the eye was found to interfere with lens differentiation but was not sufficient to cause malignancies. H. Land had introduced the co-operativity between oncogenes as an aspect of carcinogenesis by discussing the co-expression of nuclear oncogenes (myc, E1A, and SV40 large T) and ras in Schwann cells. Ras expression alone causes cell cycle arrest, but when the nuclear oncogenes are expressed as well, the response is altered to cell proliferation and transformation.

In addition to the seminars, there was a large number of posters of consistently high quality in both content and presentation. A highlight was J. Raff's contribution, which was awarded the BSCB poster prize. Raff's work described cytoplasmic and nuclear events in *Drosophila* embryos in which centrosome replication and cortical budding continue despite the inhibition of nuclear replication.

Considered as a whole, the Autumn BSCB meeting provided a good overview of the various techniques and model systems currently used in the study of differentiation. There was also a sense of confidence in the potential of this research to lead to a final unravelling of the mechanisms controlling development, which D. Baltimore, in the keynote address, suggested might be achieved within 10 years. As a counter to this optimism it is perhaps pertinent to point out that the detailed elucidation of the complex mechanisms of regulating gene expression may not provide the whole solution. Certainly information of the type contributed by the study of a variety of cis- and trans-acting factors will be essential to our reading of the final story. Nonetheless, a wider mechanistic perspective on gene regulation will be necessary to uncover the orchestration of events that produces precise patterns of cellular diversity. The nature of cellular clocks and programmes and their relation to probabilistic events, for example, still present significant obstacles to our understanding of differentiation.

The hard core science aside, everyone seemed to enjoy the occasion im-

mensely. We are sure that we are expressing the common sentiment in thanking Fiona Watt and Bruce Spiegelman for organizing this excellent meeting.

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