

Identities of an embryology journal in a molecular age; or, How Development got its name

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ABSTRACT

Journals build identities to attract authors and subscribers. Name changes make the stakes explicit. This article explains how the plain *Journal of Embryology and Experimental Morphology* (JEEM) turned into the glossy *Development* in 1987. Newly opened archives reveal long-term negotiations that illuminate transformations in periodical publishing and in disciplinary politics. Founded in 1953, JEEM welcomed descriptive as well as experimental research on animal development, but the rise of molecular approaches called into question title and scope. In 1970, the editors refocused on mechanisms of development, but a powerful editorial board rejected a new name. Then the owner, the Company of Biologists, abolished the board and began to professionalize; editors promoted gradual reform. Responding to intensified competition, represented by the journal *Cell*, and to falling submissions and declining library sales, the Company pushed for molecular papers as it became its own publisher and printer. This let the relaunched *Development* offer speed, colour and reinvestment in science to recruit personal subscribers as well as authors from a community generating hot data. The story spotlights the actions of a charity in the transition from clubbiness to professionalism and evidences a commitment to the experimental tradition while promoting molecular studies.

KEY WORDS: The Company of Biologists, Embryology and developmental biology, History of scientific journals, Molecular cell biology, Serial title changes

Introduction

Renamings of journals signal changes in identity and speak volumes about publishing and science. Librarians exasperated by ‘costly, silly [and] unnecessary’ variations used to give out a Worst Serial Title Change of the Year Award (Mering and Simpson, 1996). But names matter for periodicals as much as for people and places. Though contents, instructions for authors and editorial boards also shape remits, we notice names first. So editors and publishers risk losing back-number sales, subscriptions, impact factor and goodwill to amend a title they fear no longer fits (Guha et al., 1975–1977; Schopler et al., 1979; Forsyth, 2007; Thatje, 2014). Think of the shifts in language and discipline when *Annals of Eugenics* became *Annals of Human Genetics* (Kevles, 1985, 252); or the *Zeitschrift für induktive Abstammungs- und Vererbungslehre* (*Journal of the Inductive Science of Descent and Heredity*) renovated as *Molecular and General Genetics*.

The most eye-catching makeover in developmental biology converted the *Journal of Embryology and Experimental Morphology*, or JEEM, into *Development* in 1987. An unwieldy title few understood gave way to a one-worder. A two-monthly hardback with covers bearing just text yielded to softbound issues adorned with a different colour photo every month. A British journal went transatlantic and international. Plants joined animals. A

distinguished venue for experimental reports drew in much of the research that uncovered the molecular mechanisms of development.

Chris Wylie, the reforming editor-in-chief, looked back on the change in identity as a ‘metamorphosis’, a process developmental biologists know well (Wylie, 2012). But his reference to the Time Lord Dr Who suggested something more mysterious, and in fact the regeneration is still little understood. Digging into hitherto unexplored archives to go beyond the brief existing accounts (Skaer, 2001, 124; Wylie, 2002, 2012), this article reinterprets the transformation. Along the way, I expand knowledge of periodical publishing during a little-studied period of innovation. I enlarge histories of developmental biology by showing how the bastion of an experimental tradition responded to not one, but two waves of ‘molecularization’ (Fantini, 2000; Hopwood, 2009, 308-312; Morange, 2020, ch. 22).

As the postwar expansion of scientific journals slowed and the market saturated in the 1970s (Meadows, 1980; Mabe and Watkinson, 2019; Fyfe et al. 2022, ch. 15), library sales stalled but a few titles thrived by growing individual subscriptions. The general weeklies *Science* and *Nature* (Walsh, 1980; Wolfle, 1980; Baldwin, 2015, ch. 7), and especially *Cell*, a self-described ‘journal of exciting biology’ (Lewin, 1974), enticed authors and subscribers with speed, the new ‘impact factors’ (Csiszar, 2020) and good looks. More specialized journals used new printing technologies to follow suit. As molecular biology and its competitive culture swept studies of development, *JEEM* seized this opportunity.

I approach the relaunch as representing dozens of less documented conversions to glossy professionalism and as special, because the Company of Biologists, a charity run by scientists for scientists, owned and then also published and printed the journal. Although often credited to one person (Eve, 2025, 2), innovation was not just ‘a team effort’ (Wylie, 2012), but stimulated and stymied in the interactions of editors and editorial boards, publishers and printers, authors and subscribers and, not least, Company directors and officers. Recovering the negotiations gives us a ringside seat at fights that redefined a field.

These discussions are all the more instructive because what appeared as a big bang turns out to have unfolded over decades. To grasp that long revolution we need to begin in the 1950s, when *J. Embryol. exp. Morph.* joined *Arch. EntwMech. Org.* as a most puzzling abbreviation and yet made perfect sense.

A journal of morphogenesis

Embryology had a low priority during World War II and came to seem fragmented (Hopwood, 2009, 2019). When peace arrived, a group of biologists aimed to assemble approaches. Learned societies still made the running in journal publishing (Goodwin, 1987, ch. 6; Whiffen and Hey, 1991, ch. 6; Postgate, 1995; Lewis, 1999, ch. 8; Fyfe, 2021; Fyfe et al., 2022, ch. 14), while the profits from expansion lured entrepreneurs (Miranda, 2001; Schmidtke, 2020, ch. 6). But in the end the founders of *JEEM* mobilized other institutions.

The plan went back to a ferment of activity around the first embryological society, the Institut International d’Embryologie headquartered in Utrecht, and acknowledged Japanese colleagues’ foundation of the English-language *Embryologia* (Dalcq, 1953). When Dutch researchers could not find ‘an enlightened publisher’ (Newth, 1979), members of the London Embryologists’ Club, founded in 1948 (Slack, 2000), took over. They conducted ‘a great deal of patient negotiation’, including ‘several abortive efforts’ with publishers and other funders over more than two years (Newth, 1979).

Michael Abercrombie led the campaign from the Department of Anatomy at University College London, which housed the nation’s only Subdepartment of Embryology. He explored the options with David Newth from Zoology and John Z. Young, head of Anatomy. They then sought colleagues’ opinions on ‘launching a new journal to co-ordinate and stimulate all aspects of morphogenesis’ in the broad sense of the development of form in

ontogeny or regeneration. They met at the Society for Experimental Biology in January 1951.¹

Abercrombie tried his own university's Athlone Press, but they wanted money and nothing came of a 'very tentative approach to the Nuffield Foundation'.² His contact with Robert Maxwell's aggressively commercial Pergamon could have led in a very different direction (Elsevier bought it in 1991). Then the Wellcome Trust agreed to underwrite the project with £2000 (equivalent to about £75000 today), and Abercrombie's group brought the proposal to the Cambridge-based Company of Biologists.³

A few dozen scientists founded this organization a quarter century earlier to rescue the ailing *Journal of Experimental Biology*, which Cambridge University Press (CUP) published on its behalf (Erlingsson, 2013; Bray et al., 2025). The Company later added the *Quarterly Journal of Microscopical Science*, published by Oxford University Press (OUP) at the Clarendon Press, and was incorporated as a charity in 1952 (Skaer, 2001, 118). CUP did not want another journal, so the Company tried the Chaucer Press and Academic Press, which was opening a London office, but went with OUP.⁴

The administrative history of JEEM is a tale of two boards and the competition as well as cooperation between them. The Company's board of about a dozen unremunerated directors took responsibility for publication and printing contracts, management and financial stability. One was elected chairman. Employing a biologist as company secretary for perhaps 'one hour per week' (Skaer, 2001), then also an assistant (later financial) secretary and a secretary, the Company paid modest stipends to editors (who attended board meetings) and editorial assistants but was not supposed to influence editorial policy (Parry, 1958).

JEEM's Editorial Board (EB), which grew out of Abercrombie's founding group to a maximum of thirty, nominated the editor—him for the first nine volumes—and a Company director as well as advising on scientific direction and standards. EB members were expected to contribute, encourage contributions and be available for peer review (then called refereeing). The EB was half British (mostly London-based), half from other west European countries, plus the emigré Johannes Holtfreter as the sole German and American (Fig. 1). A Russian, a Japanese and a few more Americans joined later. [[Figure 1 about here.]]

Existing members proposed new ones for ten-year terms with the possibility of reelection; in the postal ballots two votes against acted as a veto. A chairman (Young was the first) and secretary (Newth) did three-year stints, which, like the editor's, could be renewed. The EB met annually and, following an inaugural meeting funded by the British Council in January 1953, obtained grants, including from the Company of Biologists, to sponsor biennial International Embryological Conferences in European locations.⁵ The EB thus functioned as another club alongside the London Embryologists' Club and the Institut International.

JEEM represented specialization not by splitting, which is generally blamed for the proliferation of scientific periodicals, but by forming a fresh focus. Although an old science, embryology was divided between comparative, experimental and descriptive human orientations (Hopwood, 2019). Journals of anatomy and of zoology contained embryology. Roux' *Archiv für Entwicklungsmechanik* (Roux's archive of developmental mechanics) catered for experimental studies and *Contributions to Embryology* published human and other mammalian papers (Table 1). JEEM sought a broader remit. [[Table 1 about here.]]

As embryologists looked forward to expansion after the interruption and destruction of the war, JEEM set out to collect 'scattered' research and 'facilitate ... fruitful co-operation between the many different approaches' (Newth, 1953). The journal aimed 'to bring together work concerned with all the kinds of developmental process to be found in animals at any stage of their life-history. It will include work on embryology (descriptive, experimental, chemical, physiological), on regeneration and healing, on the developmental changes involved in functional adaptation, on growth, ageing, and other aspects of late

morphogenesis.’ Comparative research and teratology were ignored. Papers on plants ‘may be included if they connect with zoological aspects of morphogenesis’ (Fig. 1).⁶ Although not warm, that invitation was real enough that Abercrombie ‘opposed’ a Clarendon Press request for ‘the word “animal” to be introduced into the title’.⁷

The name grew through the negotiations. The Dutch journal would have been called ‘Morphogenesis’ (Newth, 1979), pentasyllabic but one word. Abercrombie was asked about progress with ‘the Journal of Morphogenesis’.⁸ The eventual title, ‘Journal of Embryology and Experimental Morphology’, struck later generations as awkward and archaic. It needs parsing to understand the second phrase and the asymmetry that, while ‘morphology’ was qualified as ‘experimental’, ‘embryology’ was not.

Bare ‘embryology’ stood for inclusivity and recognized, in particular, that much description ‘remains to be done’ (Dalcq, 1953). Alongside a majority of experimentalists, the EB admitted embryologists of other kinds (Fig. 1). To ‘tap new reserves of subscribers’ Abercrombie worked at one point ‘to widen the range’ with ‘papers bearing on agriculture and medicine’.⁹

‘Experimental morphology’ became a puzzle. An editor-in-chief of *Development* called it ‘bizarre’ (Smith, 2012). The expression began around 1900 as an alternative to ‘developmental mechanics’, ‘experimental embryology’ or ‘developmental physiology’ (Davenport, 1897–1899; Przibram, 1904; Goebel, 1908; Needham, 1942; 1959, 128). But it had a more specific meaning, as John Wilfred Jenkinson explained in the first British book in that field: ‘Used in the widest sense of the word, development includes not merely the formation of a new individual from a single cell ..., but also ... budding and regeneration. In a narrower sense, however, the term is restricted to the first of these processes, and a corresponding distinction is made, however artificially, between Experimental Embryology and Experimental Morphology, when the subject is treated from a physiological point of view’ (Jenkinson, 1909, 1).

The founders of JEEM revived the rare phrase in this meaning to stress the inclusion of experiments on systems that promised to shed more light on morphogenesis than a direct attack on embryology, ‘the most fiendishly difficult subject in the whole of biology’ (Medawar, 1980, 11). Abercrombie discovered contact inhibition of cell locomotion in culture (Love and Yoshida, 2025).

JEEM grew from some 400 pages in 1953 to over 1000 in 1969, while issues increased in frequency from quarterly to every two months. Growth added costs, but the Company broke even thanks to the Wellcome loan plus another £1000, which turned into grants, and £750 from the Royal Society.¹⁰ The paid circulation reached 1400 from a print run of 2100, of which back issues sold more.¹¹ Committed to providing a service, the Company did not try to make money. In that more relaxed era, people were content with an acceptance rate of 60–70% and pleased when the delay from receipt to publication dipped below 30 weeks. The proportion of submissions from the UK varied from one-fifth to one-half and was similar for the US.¹²

In 1962 Newth, a popular teacher and organizer, stepped up as editor and JEEM moved from OUP, which was slowing down and uninterested in acceleration (Nicholls, 2013, 101; Louis, 2013, 770–771), to CUP.¹³ Newth shepherded the journal through the expansion, but retired in April 1969 and four editors took over. They embarked on reform, including of the name.

Molecules versus morphology; or, Midday in Moscow

JEEM started too early to have put ‘developmental biology’ in its title. This term described the field organized from the mid-1950s as a successor to experimental embryology, though that remained active and well represented in JEEM. Developmental biology embraced the

whole living world and cellular, genetic, biochemical and then molecular methods (Oppenheimer, 1966; Gilbert, 1996; Fantini, 2000; Crowe et al., 2015; Hopwood, 2019). Founded in 1959, *Developmental Biology* became the leading journal because, although international, it was based in the US, which now produced most science, and published from 1966 under the auspices of the (US) Society for Developmental Biology (SDB). Worldwide, embryology journals began rebranding with the term ‘development’ (Guirao and Aréchaga, 1989; Okada et al., 2008) (Table 1). For JEEM, debate over the title started no later than 1969 and continued for two decades.

The London Embryologists’ Club had morphed in 1964 into the Society, soon British Society, for Developmental Biology (BSDB) (Slack, 2000). JEEM did not become its journal because the EB wished to keep a general European identity. JEEM did begin to respond to the competition and to the redefinition of the subject. In 1958, the EB saw *Developmental Biology* as a rival with a ‘stated scope ... almost precisely the same’ but expressed confidence that ‘the general increase in publication in the field’ would avoid adverse effects.¹⁴ In 1965, following a proposal from James Ebert (Baltimore) and Alberto Monroy (Palermo), the JEEM EB agreed to place ‘a greater emphasis on molecular embryology’.¹⁵

In 1969, the incoming editors, John Paul (researching chromatin and cytodifferentiation in Glasgow) in the managing role, Lewis Wolpert (advancing the concept of ‘positional information’ from London), Donald Ede (studying mutations in chick limb development in Edinburgh) and Denis New (pioneering mammalian embryo culture in Cambridge), promoted molecular approaches more strongly. A flyer invited ‘reports of experimental investigations including those using biochemical or biophysical techniques’ (Fig. 2). The editors wished to attract newcomers such as ‘biochemists, geneticists, biophysicists and virologists’. They saw ‘the quality of its contents’ as most important to ‘the image of the Journal’ but argued that this ‘would be improved by a change of name’.¹⁶ [[Figure 2 about here.]]

The JEEM editors referred to the Company of Biologists’ remaking of its sister serial, the *Quarterly Journal of Microscopical Science*, as the *Journal of Cell Science* (JCS) when this moved to CUP in 1966. A restriction to cytology excluded papers on tissue organization such as a previous editor had authored (B[aker] and C[allan], 1962; Callan and Grimstone, 1965).¹⁷ The JCS editors, electron microscopist A. V. (Bill) Grimstone as ‘the moving spirit’, with chromosome expert H. G. (Mick) Callan, promoted a ‘new look’.¹⁸ Grimstone saw off a protest against ‘a “cellular” revolution’ that in some ways anticipated the ‘molecular’ one at JEEM.¹⁹ He was, however, forced to give up his preferred title—“‘Cell’ is one which he likes”²⁰—and even the still pithy ‘Cell Science’. Those fighting the elimination of tissue-level research pettily insisted that ‘two words from the old title [‘journal’ and ‘science’] are better than one’.²¹

Paul brought the JEEM editors’ case to the EB at the International Embryological Conference in Moscow in August 1969,²² where he and Wolpert canvassed opinion. Morphologists preferred the existing title, but those taking biochemical approaches and in peripheral disciplines favoured change. Many would not contribute because the name ‘gave undue prominence to morphological studies and descriptive embryology’. Paul and Wolpert regretted that ‘embryology’ and ‘morphology’ rather than ‘experimental’ shaped identity. They believed that the last ‘was intended to convey the spirit of the Journal’, although its stance had in fact been less partisan. Many thought that JEEM stood for ‘Journal of Experimental Embryology and Morphology’.²³

Nature wrote up the conference as ‘Midday in Moscow’—a play on the song ‘Midnight in Moscow’—but for the JEEM editors high noon came by circulation the following year.²⁴ In spring 1970, they proposed renaming it ‘Embryology and Development’. They mentioned ‘Journal of Development’ and ‘Journal of Developmental Science’ (like

Journal of Cell Science) as ‘acceptable’ alternatives. A ‘shorter and less restrictive’ title would encompass ‘good descriptive’ and ‘molecular biological studies’.²⁵

We have one EB member’s remarkable response. Geneticist Hans Grüneberg doubted that a new name would rescue ‘a temporarily unpopular subject’ but he would not ‘stand in the way’.

I am, however, not in favour of the proposed title ‘Embryology and Development’; ... these two words have the same meaning and, in any case, it is embryology that people shy away from. The title ‘Journal of Developmental Science’ is unnecessarily long: ‘Developmental Science’ would be quite enough. ... To go a step further, ... Why not call the journal simply ‘Development’?²⁶

Grüneberg would have known the single-word titles Genetics and Heredity, and some with subtitles, such as Brain: A Journal of Neurology (Merrill, 1931). The Growth Society, predecessor of the SDB, had published its symposia in Growth: A Journal of Development and Increase (Hammett, 1937). It would take a decade and a half for Grüneberg’s suggestion to surface again.

The EB defeated the motion to change the title.²⁷ Perhaps, with Grüneberg, they did not see the proposals as clear enough improvements to abandon a valued identity. Maybe they wanted to keep the word ‘experimental’ as the best bit of the existing name. The editors had also moved too soon. The second ten-year terms of the remaining founders, already ‘long in the tooth’ in 1965, expired in 1972 or 1973.²⁸ When Wolpert bounced a submission from founding EB member (and pioneer of chemical embryology) Jean Brachet, Abercrombie confided, ‘Lewis has got rid of another of the old dodderers.’²⁹

The editors did succeed in revising the instructions for authors to reflect the narrowing of the EB to experimentalists and developmental biologists. In a crucial shift they invited mainly ‘work which gives insight into the mechanisms of development’ and welcomed studies at the molecular, as well as the cellular and tissue, level (Information about the journal, August 1970). Tightening up peer review, the editors rejected unconvincing descriptive papers from long-term supporters.³⁰ They removed the taxonomic restrictions, but the EB added no botanist or microbiologist and animals dominated still.

Old-timers’ affection having protected the ungainly title, this period of intergenerational conflict had refocused on mechanisms, with its privileging of experiments, and embraced molecules without entirely rejecting morphology.

Battle of the boards; or, Funeral in Berlin

Relations between the editors, the EB and the Company of Biologists were troubled through the 1970s. At an extraordinary EB meeting in 1972 New, now managing editor, and Ede led a reform. To raise turnover and the proportion contributing to the journal there would now be just 20 members with five-year terms.³¹ But New championed the EB as an institution. He even wanted to sever the link to the Company, which he disparaged as a source of problems and extra work. Newth had to explain that, since the EB could not take on ‘major financial commitments’, without the Company ‘we should have to look for a Society or a publisher to own us ... You would be back with two boards.’³²

The EB did not move against the Company. The Company moved against the EB. In 1977, the directors resolved to put JEEM on the same basis as its stronger journals by removing this layer of administration.³³ The Company chairman, parasitologist David Crompton, engineered the appointment of a director, John Gurdon, famed for nuclear transplantation, as EB chairman, and of his former student Ron Laskey as secretary, with the sole purpose of abolishing the EB by mass resignation.³⁴

When ‘our young iconoclasts’ signed a circular to that effect, the peremptory behaviour enraged Newth.³⁵ But the emollient Abercrombie, who as a Company director

heard both sides, concluded ‘that the EB has served its turn. It is a cumbersome machine and a perpetual irritant to COB bureaucrats’.³⁶ He told EB members that times had changed, and Newth co-signed that ‘unenthusiastic suicide note’.³⁷ The EB dissolved itself in September 1978 at a meeting in Berlin that Newth experienced as ‘like a funeral’ wreathed in ‘guilt and gloom’.³⁸ The European Developmental Biology Organisation assumed responsibility for the JEEM conferences during which this umbrella society had been planned (Škreb and McKenzie, 1981). The EB, ‘for a quarter of a century, a body with a defined personality’, was no more.³⁹

Although the Company now had the ‘ready authority to make long-term changes’ (Skaer, 2001, 119), and would use this later, JEEM turned inwards. Perhaps to make refereeing easier, 28 of the new ‘Editorial Advisory Board’ (EAB) were based in the UK, a mere four in continental Europe and one in the US. (Just four were women, a proportion that would rise only slowly over the following decades.) A few Americans joined, but, for the next eight years, the editors bucked the trend to internationalization (Meadows, 1980). They did not identify falling foreign submissions as a particular problem. But no sooner had the Company approved a jump from 1500 pages in 1977 to 1900 for 1978, than a shortage of papers directed attention to making JEEM more attractive and better known.⁴⁰

R. M. (Mike) Gaze, who headed a division of developmental biology at the National Institute for Medical Research (Hope, 2023), had become managing editor in 1976. With Richard Gardner and Peter Lawrence, Gaze guided the journal through a decade that began with leisurely reform but—burned by the experience of Wolpert et al. and more content with the status quo?—caution about changing the name. After ‘much thought’, the editors ‘have not been able to arrive at any suggestion which would be an improvement. The present title has certain advantages. It has the standing of tradition and ... says precisely what the Journal is all about.’ They accepted, however, that it ‘is too much of a mouthful. It lacks punch.’ Their solution: ‘alter the style of the ... cover so as to promote the word “JEEM”’ (Fig. 3A-B).⁴¹ [[Figure 3 about here.]]

Reform postponed, printing controlled

Real innovation would come from a distinctive version of an industry-wide move towards professionalized management, though at the Company still under scientists’ control. Like some other specialized journals, JEEM responded to the stagnation of library sales during the 1970s by emulating the few titles that wooed individual subscribers with rapidity, reach and desirability.

Plain packaging had announced a periodical as scholarly or scientific until 1959, when *Science* magazine began varying cover photos. *Nature* introduced these in 1971 (Walsh, 1980, 55; Myelnikov, 2014, 163-64). Then molecular biology met Madison Avenue. The claim that in 1974 the first issue of *Cell*, founded by a professional editor, ‘changed the face of scientific publishing’ is aptly hyperbolic. It did sport striking covers, declarative article titles and high-quality figures. ‘Helvetica coursed across the pages, and the physical journal was a pleasure to hold and flip through’ (Marcus, 2014) (Fig. 3C).

Novel printing technologies would allow imitation. At JEEM, this modernization lasted a few frustrating years. But in June 1983, when the editors pushed to reduce further the publication delay, which had fallen to 39 weeks, and make ‘a variety of other, major, changes’, that innovation was under way.⁴²

The Company, which in Richard Skaer now employed a full-time company secretary, had the resources to accelerate publication.⁴³ It started receiving the subscription income from CUP gross monthly rather than net at year’s end (Skaer, 2001, 120). The wizardry of financial secretary Simon Maddrell, in whose lab a ‘TV screen display[ed] by turn the currency exchange data and the stock market levels’, generated a surplus to put to work

(Skaer et al., 2020). An extraordinary move to paying referees who reported within two weeks had a ‘magical’ effect (Skaer, 2001, 122).

More important was stopping articles and issues languishing in queues at CUP. In 1983, the Company took over as publisher (not just owner), exploiting the transition to typesetting from computer discs to do this in-house and contracting a printer. Then the Company bravely set up its own printing works. Luck with labour relations let it negotiate the industry-wide revolution from hot metal to offset litho. From December 1984, JEEM proclaimed that it was ‘Typeset, Printed and Published by The Company of Biologists Ltd’. Now only distribution was outsourced, to the Biochemical Society (Skaer, 2001, 120).⁴⁴ In the short term, however, the disruption pushed the situation at JEEM from bad to worse.

Having consulted and compared, Gaze reported in September 1983 that he judged *Developmental Biology* ‘the leading journal over the whole developmental field’, and JEEM ‘either the leader or the joint leader’ (with the *Journal of Experimental Zoology*) of a following pack that included Roux’s *Archives and Anatomy and Embryology*. JEEM was losing submissions and sales, but Gaze, impressed by healthy citations—a lagging indicator—reckoned that ‘what we are trying to do is good. We need to do it better.’⁴⁵

Gaze looked forward to following *Developmental Biology*, which had gone monthly in 1967. A new style, with two columns to enable more flexible layouts, a smaller typeface and a redesigned cover, would, with ‘imaginative publicity’, steer JEEM ‘in the right direction’. Aware that “‘experimental morphology’ ... has been held to put off people with molecular interests’, Gaze still decided not to alter the title.⁴⁶ Instead, he proposed to stimulate submissions from the US. The editors had appointed six board members ‘from America’ but hesitated over a US editor.⁴⁷

It would soon seem impossible to keep the title and attract US papers, but for the moment JEEM looked set to join those journals that stick with a name for the sake of tradition or a brand (Nilius, 2011; Zimmermann and Paß, 2022). Then, as part of more active management, the Company confirmed Gaze’s position while beginning to seek to influence editorial policy (which it had pledged not to do): a subcommittee of directors called for JEEM to follow the field in a molecular direction.⁴⁸ Gaze later offered the tiniest tweak in the name: “‘Journal of Embryology and Morphogenesis’ or ‘JEM.’” Neither side yet sought radical change.⁴⁹

Also in 1984, the Company began to support annual conferences of the BSDB and publish the proceedings as supplements to JEEM.⁵⁰ These ‘contained articles ... often more topical and exciting ... than those in the parent journal’ (Wylie, 2012; also Slack, 2000). The BSDB publications officer Chris Wylie, an expert on amphibian germ cells in London then Cambridge, negotiated the deal (Johnson, 1986; Donovan and Wylie, 2013). A BSDB proposal to produce a review journal did not lead directly to the relaunch.⁵¹ The black covers do prefigure the style, the contents did Wylie credit and becoming a director drew him into planning reform (Fig. 4). The Company put money into commissioning review articles with which to claim cellular and molecular territory.⁵² [[Figure 4 about here.]]

Still JEEM stayed the same. Printing delays so worsened that the editors feared ‘decline to a state from which recovery would be difficult or impossible’. As goodwill ran out, they advised postponing restructuring lest it look like an attempt ‘to cover up ... failures by merely cosmetic changes’.⁵³ Then, with production smooth, thanks to printer Tom Galliers and his staff, the Company set off on its own path to reform.

Deciding for a molecular Development

In January 1986, Skaer asked the Company board how to capitalize on the hard-won capacity to print quality at speed. Cell was driving ‘intense’ competition: publication within three months attracted prestigious papers, increasing sales (to 9,500 copies) and keeping prices

down. It had an ‘impact factor’—becoming a crucial metric—of 16 when *Nature* was on 10, *Developmental Biology* on 3.5 and *JEEM* on 2.0 in 1984. Should Company titles come out monthly and target a similar delay?⁵⁴ Skaer recalled the advice of ‘one of our most distinguished Directors [Gurdon] that our uncomfortably-named journal *JEEM*’ had ‘a window of opportunity, owing to one of its American competitors [*Developmental Biology*] becoming staid, slow and pernickety’ (Skaer, 2001, 124).

The board set up a Publications Sub-Committee, including three developmental biologists—Brigid Hogan (the first European editor of *Cell*), Gurdon (on the editorial board) and Wylie (whom Academic Press had approached about ‘setting up a European competitor to *Cell*’)—‘to look ... into the area of the molecular aspects of cell and developmental biology’.⁵⁵ They recommended that Company journals ‘compete by doing away with a slightly “dusty image”’.⁵⁶ As genetic screens, molecular genetics and monoclonal antibodies combined with microsurgery, histology, cell biology and biochemistry to reveal the molecular networks that regulate development, commercial publishers eyed the field. Cold Spring Harbor Laboratory Press was known to be planning something. But the Company’s ‘production line’ could now ‘compete’ on ‘speed and quality with the best’. The Conservative government’s ‘underfunding of British science’ reinforced the urgency of appointing a US editor.⁵⁷

On all that, like the format, consensus reigned. Controversial was the top-down procedure that ignored how much the editors had already planned and the directors’ urge to pull in molecular papers even at the expense of *JEEM*. The Company explored either replacing *JEEM* and *JCS* with ‘a European version of *Cell*’ or otherwise amalgamating them.⁵⁸ Conversely, it considered ‘starting a new journal for molecular and cell biological articles’ in developmental biology or ‘subdividing *JEEM* into a section on morphogenesis and a section, with its own editor and editorial board, to cover the molecular area’.⁵⁹

The editors were shocked and frustrated that their own innovations, long postponed by the production delays, had now been ‘stopped’.⁶⁰ Gaze, Gardner and Lawrence (on the board of *Cell*) rejected ‘a separate “molecular” part of *JEEM*’ as ‘unacceptable’. They had aimed ‘for some while to attract more cellular and molecular work’ and a ‘new *Journal of Molecular Embryology*’ would ‘make matters more difficul[t]’. They had ‘wished to preserve the width of developmental interest’ for which *JEEM* was known and to ‘shift the emphasis’ in molecular, genetic, cellular and neurobiological directions. ‘The recipe was largely that of *Developmental Biology*, with a mixture of *Journal of Neuroscience* and a whiff of *Cell* and *EMBO Journal*’.⁶¹

The name still ‘caused a lot of difficulties’, Gaze continued. ‘[T]he term “Morphology” is offensive to some people, perhaps suggesting dissecting rooms in medical schools. ... [I]t has been suggested that, among American students, embryology is merely d[e]scriptive whereas anything experimental is “developmental biology.”’ Yet ‘*Developmental Biology*’, ‘the only title that all could agree on’, was taken. They considered various options, including *Development*—Grüneberg’s suggestion reappears in the record—and now went for ‘*Journal of Embryology*’.⁶²

In July 1986 the Company directors, with Hogan, Laskey, Wolpert and Wylie present, decided ‘that *JEEM* should change in a major way to include cellular and molecular papers’ but withdrew the suggestions that it be divided or forced to compete with a molecular journal.⁶³ Gaze did not wish to shoulder the extra burden as managing editor. Did he also sense that the board preferred someone else? The editors proposed Martin Johnson, because he ‘does a good job’ as ‘chairman’ of the BSDB, was Cambridge-based and could inherit mammals from Gardner.⁶⁴ The meeting invited Wylie instead.⁶⁵

The directors agreed on ‘a major change of title ... to draw attention to the changes proposed for *JEEM*’. They voted ‘10:1 ... in favour of “Development” over several

alternative titles based on “Embryology”. The minutes do not explain the decision, but since ‘[i]t was seen as essential’ to ‘penetrate more into the American market’, the case probably prevailed against the word ‘embryology’ as old-fashioned there.⁶⁶ When Cell challenged Nature and Science as *the* place for cell and molecular biologists to publish, ‘Journal of’ sounded almost as mausoleum-like as ‘Acta’, ‘Archives de’ or ‘Zeitschrift für’. Wylie has written that he already had ‘Development’ in mind (Wylie, 2012).

But was the term ambiguous? To the objection that it sounded like international aid, Laskey countered that ‘Cell is not mistaken for something on prison reform, honeycomb structure or monastic design’. Bill Grimstone added, as editor of JCS, that they had not called it Cell in 1966 because of concern that it be taken for a title in criminology.⁶⁷ An unlikely revolutionary (Amos, 2019) taught the lesson: let’s not miss another chance.

Many still felt affection for the old JEEM. Amphibian embryologist Jonathan Slack saw it as ‘the guardian of the idea that the core of developmental biology was the regional specification of pattern’. ‘[S]econd-rate journals ... published ... biochemical studies of developing systems’, but the ‘bearing’ of biochemistry on ‘the problems of patterning’ was just being established. ‘I felt that the drive to “modernise” JEEM would ... sacrifice its unique value.’ Slack found ‘experimental morphology’, a phrase he learned from the journal, so ‘cool’ he gave his Imperial Cancer Research Fund laboratory that name.⁶⁸

Even the author of the first article in Development confessed, when he became editor-in-chief, to ‘a slight wobble’. ‘Perhaps it was because ... I had ... published some 11 papers in JEEM and ... didn’t want them to disappear into obscurity’, wrote Jim Smith, who had done a postdoc with Slack. ‘But in the end’, ‘pleased’ to see the back of ‘experimental morphology’, ‘I accepted that one-word titles were the way to go’ (Smith, 2012).

Embodied by a fresh name and a new chief editor, the revamp incorporated the existing plan. Renaming as ‘Development’ could appear as ‘a compromise’ because ‘all-embracing’ and thus neutral between molecules and morphology.⁶⁹ It stood for transformation still.

Submissions and sales surge

Change at Development responded to the heating up of a field, as comparison with JCS shows. With a managing editor (Grimstone) in post for two decades, the sister journal modelled much of the new format, highlighted the molecular level around the same time and appointed a US editor only a little later. But at Development a chief editor with verve and vision met a community hungrier for more publishing options and better. With library sales under pressure as costs outpaced budgets, Development hoped to attract authors and augment the tiny percentage of individual subscriptions by making the journal needed for news, loved for looks and (when discounted for society members) paltry enough in price.

Of the elements that Wylie identified as ‘driving ... the metamorphosis’ ‘Americans’ and ‘molecular genetics’ had long been on the horizon. Finally getting serious about ‘plant biology’ was his surprise (Wylie, 2012). The statement of aims welcomed ‘[s]tudies on both plant and animal development’, in that order (Information about the journal, January 1987), and as an editor Wylie recruited Keith Roberts (John Innes Centre, Norwich). Roberts had not been involved with JEEM but, as coauthor and illustrator of the field-defining textbook *Molecular Biology of the Cell* (Alberts et al., 1983), was committed to fostering interaction between research on plants and animals. ‘I loved the name’, he recalled. ‘It was short and punchy.’⁷⁰

The editors invoked change and reassured existing authors. After all, mechanisms and the molecular level had featured in the statement since 1970 and this hardly changed. JEEM would stay ‘the premier journal of morphogenesis’, while emphasizing ‘molecular and cellular development’.⁷¹ The new name would reflect the ‘wider scope’ of papers already

published and invite contributors ‘to widen it further’.⁷² Or, as Wylie told the Company board, he aspired ‘to reflect all the aspects of this fascinating subject’.⁷³ The makeover nevertheless prompted gentle cynicism about the shift to requiring molecular markers. Slack advised students: ‘When you want to publish in Cell, do an RN[ase] protection assay. When you want to publish in Development, do a Western [blot]. When you want to know the answer, look down the microscope’ (Summerbell, 1989).

Gardner, Gaze and Lawrence denoted continuity.⁷⁴ Recruiting two US editors in Cambridge, Massachusetts declared change: Richard Hynes, a Brit who had studied the extracellular matrix in a variety of systems at MIT, and Doug Melton of Harvard, a hotshot protégé of Gurdon applying molecular biology to embryonic induction in *Xenopus*. The Company deemed securing Melton so important (and had deep enough pockets) that ‘We must pay what is necessary ... e.g. ½ a Secretary’.⁷⁵ Still an associate professor, Melton liked having the authority to act on his own. This allowed him to solicit papers by telling prospective authors that he would aim to handle a submission within two weeks and that they would deal with him directly not a committee.⁷⁶ His involvement ensured US success. Further to galvanize a community Wylie appointed 20 international members of the EAB in the first half year and cleared out the less active UK folk as soon as he could.

Development advertised a publication time of three months, following an average of three-and-a-half weeks in review, and ‘extremely high’ production standards: ‘300-mesh screen’ for ‘half-tone reproduction; high-quality colour plates ... *without charge*, at the Editors’ discretion; and the binding is sewn, not glued, so it won’t fall to pieces in the photocopier!’⁷⁷ Wylie adopted the new text style of JCS for the US quarto pages.⁷⁸ He moved in step with EMBO Journal and Developmental Biology to entice authors to compete to put their photos on the cover (Fig. 3D, Fig. 4B). Publicity included posters (Hopwood, 2022, 15-16) (Fig. 5). Increasingly needed to reproduce distinctions between molecular stains, colour let researchers see ‘their work showcased for its beauty as well as its scientific merit’ (Wylie, 2012). It facilitated a pictorial turn in an already visual field. Advertising also vaunted the absence of page charges (which were standard in the US), 200 free offprints (which labs would mail out) and the price. The editors explained ‘the seeming paradox of high standards and low subscription rates’: ‘a non-profit-making company’ invested in science.⁷⁹ [[Figure 5 in previous paragraph or about here.]]

With submissions nearly doubling in the first year, the journal swelled from about 2380 old pages in 1986 (equivalent to 1540 of the larger, denser new ones) to some 3930 in 1991 (without supplements) before falling a little.⁸⁰ By 1990, the editors were content with the quality as stronger cellular and then also molecular papers came in. They reduced the acceptance rate from 58% in 1986 to 38% in 1994.⁸¹ This crackdown ‘wrestl[ed]’ with “‘descriptive manuscripts’”, an old bugbear at JEEM that reappeared in molecular form as ‘those that do not contain an experiment, but describe the distribution of a gene product’. Wylie and colleagues prioritized ‘experimental studies ... which offer new insights into developmental processes’ but accepted descriptive papers ‘of particularly high quality’. That judgment ‘led to great controversy’.⁸² Melton, who had studied history and philosophy of science, told me that ‘while description was denigrated, there would be no science without description’ and asked, ‘what did th[e] term [mechanism] even mean?’⁸³

Submissions internationalized to match the EAB and the addition of west-coast US and (continental) European editors. Manuscripts from the UK fell from 38% in 1986 to 14% in 1992.⁸⁴ Developmental Biology had struggled to recruit botanists and Wylie initially found plant submissions ‘a big disappointment’.⁸⁵ But these picked up because Development offered communities working on, for example, plant homeotic genes the chance to be read by animal people. The journal ‘looked fantastic’ and ‘there was huge competition to get your photos on the cover’.⁸⁶

The relaunch raised the number of personal subscriptions fivefold by 1991 (Fig. 6). The Company promoted '[t]wo journals making great strides, at a price you can afford'.⁸⁷ But with similar changes the total paid circulation of JCS fell from 1391 (1986) to 1304 (1992), while that of Development rose from 1403 to 2047 compared with 1850 (1992) for Developmental Biology.⁸⁸ Company publishing no longer just broke even but produced solid surpluses.⁸⁹ [[Figure 6 in previous paragraph or about here.]]

As editors and publishers in developmental biology watched their competitors, Wylie saw Development lose molecular papers to a journal that launched simultaneously.⁹⁰ The Genetical Society of Great Britain, which owned Heredity, wanted a second title to cover molecular work. It found a partner in the professional editor Steve Prentis, who started the review journal Trends in Genetics for Elsevier then moved to Cold Spring Harbor. He suggested that adding 'development' to 'genes' to give Genes & Development would attract more papers.⁹¹ But it focused on 'gene expression and regulation' in 'development and differentiation' (Bulfield and Prentis, 1987). Wylie reported, 'Molecular people regard G & D as equal or ahead of us, whereas developmental biologists regard us as well ahead.'⁹²

Eager to expand in the US, the Company of Biologists challenged Developmental Biology, the former market leader, by advertising Development as '*the developmental biology journal*' (Fig. 7A).⁹³ Wylie was told that John Gerhart, the frog expert at UC Berkeley, 'march[ed] into an SDB Board meeting carrying a copy of Development'—one showcasing colourful *Xenopus* oocytes when the covers of Developmental Biology were still black and white—'and ... demand[ed] "why can't we do this[?]"'⁹⁴ The Company noted that Development's impact factor rose to 7.5 in 1993, overtaking Developmental Biology on 4.3.⁹⁵ [[Figure 7 about here.]]

The US title battled to 'maintain our competitive edge' and 'reverse any loss to the new journals'.⁹⁶ The stakes were high: the SDB received most of its income from sales but was having difficulty balancing its duties to the journal and to members.⁹⁷ Developmental Biology hit back at rivals (Fig. 7B), but the SDB and the Company also cooperated by sharing mailing lists and offering discounts.⁹⁸ A decline in submissions helped reduce a notorious delay.⁹⁹ A reformed journal offered two free colour plates to 'compete with Development'.¹⁰⁰

Development had caught up, transformed itself and promoted the reshaping of its chief competitor and of the field. So long in the making, its renaming symbolized this change.

Conclusion

As groups negotiated identities innovation arrived on several timescales. The writing was on the wall for JEEM's broad, inelegant title, one might have thought, almost as soon as the London club became the BSDB. Yet in 1970 the editors failed to remove 'morphology'. They did narrow the remit by stressing developmental mechanisms, thus letting a core set of authors treat JEEM as a journal of experimental embryology. Then a community doing hot science needed more, faster and more colourful places to publish. The Company of Biologists imposed a molecular agenda on long-standing reform proposals and everything came together. But until they agreed on the name Development six months before the overhaul, some modification of JEEM seemed sure to win.

The revamp exemplifies a transition to shiny professionalism in scientific journals and a specific response to declining library sales: attracting personal subscribers as well as authors. Cell had thrown down a gauntlet with its speed, glamour and molecular-cellular orientation. The Company's switch to in-house printing laid the groundwork for competition on pace, price, production values and the promise, unlike Cell, to plough profits back into science. Development stood out, because pent-up demand made the shift sharp, the Company's resources and ethos facilitated a luxury package and the journal served a

community poised to generate masses of data. The Royal Society's general periodicals did not target individual subscribers (Fyfe et al., 2022, ch. 14). Studies of other field-specific journals could throw the Company's strategy into deeper relief.

The long transformation illuminates two phases in the molecularization of experimental embryology. For JEEM this began in the mid-sixties, when the journal adopted 'molecular embryology'. The 1980s, the era of applying gene cloning and monoclonal antibodies, then brought concerted change. A molecular imperative accompanied and clashed with the valorization of experiment that still defined experimental embryology. The compromise prioritized experiments (using molecular assays) while accepting illuminating molecular-level descriptions (but see Smith, 2012). Analysis of published articles would show to what extent content altered with the emphasis on mechanisms in 1970 and after JEEM became *Development*.

That survey could extend into the early twenty-first century, when the Internet revolutionized periodicals and developmental biology fell on hard times. The Company of Biologists professionalized further but stopped running a printing house. *Development* expanded the front section, introduced topical sections and created a community blog. Identity continued to be debated. To promote the inclusion of a lively new field, editor-in-chief Olivier Pourquié proposed, as 'a bit of a provocation', changing the name to 'Development and Stem Cells', 'just to force people to think about it'.¹⁰¹

Today, the journal faces fresh challenges, chiefly around open access. The transition of 1987 takes us back to a time when readers awaited physical issues and thumbed through the contents. In that bygone print culture, *Development* owed its success not only to catching and driving disciplinary change, but also to price and good looks.

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Notes

- ¹ Michael Abercrombie to Peter Medawar, 13 December 1950, Michael Abercrombie Papers, Wellcome Library, London, PP/MLA/202 (uncatalogued) (hereafter **MAP**), box 21.
- ² Copy of Abercrombie to Honor Fell, 18 March 1952, MAP, box 24.
- ³ Company of Biologists board minute book 2 (1946–1965) (hereafter **MB2**), 108-109 (5 June 1952), Company of Biologists Archive (hereafter **COBA**).
- ⁴ MB2, 108-109 (5 June 1952), 118 (28 November 1952).
- ⁵ ‘Editorial Board, Journal of Embryology and Experimental Morphology’, 1952–1958, Dame Honor Fell Papers, Wellcome Library, PP/HBF/C.14, <https://wellcomecollection.org/works/scwtbujr>.
- ⁶ An earlier version: ‘General policy of the journal’, [1952–1953], *ibid.*
- ⁷ MB2, 118 (28 November 1952).
- ⁸ Conrad Waddington to Abercrombie, 3 September 1951, MAP, box 6.
- ⁹ Abercrombie, ‘Journal of Embryology and Experimental Morphology: editor’s report for 1954’, MB2, 188.
- ¹⁰ MB2, 253 (13 March 1959); Minutes, ‘1963-01 Minutes and papers’ and ‘1967-11 Board minutes’, COBSA.
- ¹¹ ‘JEEM: minimum stocks of each volume’, ‘1973-03 Minutes and papers’, Company of Biologists SharePoint Archives (hereafter **COBSA**).
- ¹² Editors’ reports, MB2 and COBSA.
- ¹³ Minutes and ‘Publishing arrangements: JEEM’, ‘1961-10 Agenda and board papers’, COBSA; ‘Memorandum of agreement’ between CUP and the Company, 15 July 1963, COBA, box file ‘CoB papers, history of the company’; on Newth: ‘Change of editorship’, *J. Embryol. Exp. Morph.* **23** (February 1970), front matter; ‘Prof David Newth’, *The Times*, 15 June 1988, 16.
- ¹⁴ Minutes of EB meeting of 24 July 1958, Conrad Waddington Papers, Heritage Collections, University of Edinburgh, Coll-41/5/2/8 (hereafter **CWP**), folder 1.
- ¹⁵ Minutes of EB meeting of 7 September 1965, CWP, folder 3, and David Newth, ‘JEEM editor’s report: 1967’ (quotation), CWP, folder 4.
- ¹⁶ ‘Proposal to change the name of the Journal of Embryology and Experimental Morphology’, [1970], Hans Grüneberg Papers, Wellcome Library (hereafter **HGP**), Correspondence: Cock–Curzon, PP/GRU/16/1, <https://wellcomecollection.org/works/vf25j55q>.
- ¹⁷ For the exclusion: A. V. Grimstone, ‘Quarterly Journal of Microscopical Science: statement of policy’, 8 May 1965, COBA, box file ‘QJMS early papers and JCS early papers’, clear plastic wallet.
- ¹⁸ Michael Swann to Abercrombie, 27 January 1965, MAP, box 25.
- ¹⁹ S. M. McGee-Russell to H. G. Callan, 8 January 1964, COBA, box file ‘QJMS early papers’, clear plastic wallet; McGee-Russell, circular to members of the Society for Experimental Biology about QJMS (quotation), [1965], *ibid.*, green plastic wallet ‘QJMS’; Grimstone, ‘Company of Biologist[s] Limited: QJMS’, 30 April 1965, *ibid.*
- ²⁰ Swann to Abercrombie, 27 January 1965, MAP, box 25.
- ²¹ McGee-Russell to R. J. Skaer (circular to members of the Society for Experimental Biology about QJMS) (quotation), [May/June 1965], COBA, box file ‘QJMS early papers’, clear plastic wallet; ‘1965-03 Agenda and board papers’ and ‘1965-05 Board minutes’, COBSA.
- ²² Minutes of EB meeting of 27 August 1969, CWP, folder 4.
- ²³ ‘Proposal to change the name’.
- ²⁴ ‘Midday in Moscow’, *Nature* **223** (1969), 1100.

- ²⁵ ‘Proposal to change the name’.
- ²⁶ Grüneberg to Curtis, 27 May 1970, HGP, PP/GRU/16/1.
- ²⁷ Lewis Wolpert to Abercrombie, 15 October 1970, MAP, box 21; Donald Ede, Denis New, Wolpert and John Paul, ‘JEEM: editors’ report, 1971’, COB board minute book 3 (1965–1972) (hereafter **MB3**), 116, COBA.
- ²⁸ Curtis to Fell, 14 July, and Fell to Curtis, 23 July 1965 (quotation), Strangeways Research Laboratory Archive, Wellcome Library, SA/SRL/G.27-43.
- ²⁹ Abercrombie to Newth, 18 October 1971, MAP, box 22.
- ³⁰ New to Grüneberg, 2 October 1972, HGP, Correspondence: James–Just, PP/GRU/37/1, <https://wellcomecollection.org/works/f6grqu8m>.
- ³¹ ‘Future arrangements for JEEM: proposals from Denis New and Donald Ede’, [1972], John Young Papers, UCL Special Collections, UCL Archives, London, J Z Young/H/J, folder ‘Journal of Experimental Morphology’; Ede, New and Wolpert, ‘JEEM: editors’ report: 1972’, MB3, 139-140.
- ³² New to Newth, 27 February, and Newth to New, 4 March 1974, MAP, box 22.
- ³³ Minutes, ‘1977-07 Minutes and papers’, COBSA; ‘JEEM is in the weakest position of the three COB journals’: Newth to Abercrombie, 31 July 1971, MAP, box 22.
- ³⁴ Phone interview with Ron Laskey, 6 March 2025.
- ³⁵ Newth to Abercrombie, 7 June 1978, MAP, box 22.
- ³⁶ Abercrombie to Newth, 20 March 1978, *ibid*.
- ³⁷ Newth to Abercrombie, 5 June 1978, *ibid*.
- ³⁸ Newth to Abercrombie, 5 October 1978, MAP, box 20.
- ³⁹ Newth to Skaer, 6 October 1978, COBA, box file ‘History COB pre-1955’.
- ⁴⁰ For the increase: Minutes and R. M. Gaze, Anne McLaren and Peter Lawrence, ‘Journal of Embryology and Experimental Morphology: editors’ report 1977’, ‘1977-07 Minutes and papers’, COBSA.
- ⁴¹ JEEM editors, ‘Editorial arrangements for JEEM’, ‘1978-10 Minutes and papers’, COBSA.
- ⁴² Gaze, Richard Gardner, Lawrence and Hugh Woodland, ‘JEEM editors’ report: June 1983’, ‘1983-07 Board minutes and papers’, COBSA.
- ⁴³ ‘A tribute to Dr Richard Skaer’, The Company of Biologists, 9 August 2021, <https://www.biologists.com/stories/a-tribute-to-dr-richard-skaer/>.
- ⁴⁴ Agreement, 15 June 1982, COBA, box file ‘CoB papers’.
- ⁴⁵ Gaze, ‘JEEM editorial statement’ (September 1983), ‘1983-10 Board minutes and papers’, COBSA.
- ⁴⁶ *Ibid*.
- ⁴⁷ Gaze, ‘Editorial policy ... (Sept. 1983)’, *ibid*.
- ⁴⁸ Minutes, *ibid*.
- ⁴⁹ Minutes and Gaze, ‘JEEM editors’ report’, ‘07-1984 Minutes and papers’, COBSA.
- ⁵⁰ ‘Memorandum of agreement’ between Company and BSDB, 27 April 1984, COBA, box file ‘CoB papers’.
- ⁵¹ Chris Wylie to Skaer, 4 October 1983, ‘1983-10 Board minutes and papers’ and Minutes, ‘01-1984 Minutes and papers’, COBSA.
- ⁵² Minutes, ‘1983-07 Board minutes and papers’, COBSA.
- ⁵³ Gaze et al., ‘JEEM editors’ report: June 1985’, ‘1985-06 Minutes and papers’, COBSA.
- ⁵⁴ Skaer, ‘Item 5: future of the company’ with ‘Appendix: competition in cell biology journals’, ‘1986-01 Board minutes and papers’, COBSA.
- ⁵⁵ Minutes, *ibid*.
- ⁵⁶ ‘Publications sub-committee minutes’ (of 21 February 1986), ‘1986-04 Board minutes and papers’, COBSA.

- ⁵⁷ ‘Item 2: decisions on the publishing area of molecular and cellular development’, ‘1986-07 Board minutes and papers’, COBSA.
- ⁵⁸ Gaze to Peter Lawrence, 29 January 198[6], Peter Lawrence’s Personal Papers (hereafter **PLP**).
- ⁵⁹ Minutes, ‘1986-04 Board minutes and papers’, COBSA.
- ⁶⁰ Gaze (for the editors), ‘Meeting of the publications sub-committee, 30th May 1986’, ‘1986-07 Board minutes and papers’, COBSA; further: Lawrence to Gaze, 3 February 1986, PLP.
- ⁶¹ Gaze, ‘Meeting of the publications sub-committee’.
- ⁶² Ibid.
- ⁶³ Minutes, ‘1986-07 Board minutes and papers’, COBSA.
- ⁶⁴ Gaze, ‘Meeting of the publications sub-committee’. For the last point: phone interview with Richard Gardner, 3 March 2025.
- ⁶⁵ Minutes, ‘1986-07 Board minutes and papers’, COBSA.
- ⁶⁶ Ibid. Hogan ‘strongly supported the name “Development”’: Hogan to author, 2 March 2025.
- ⁶⁷ Laskey interview. As a Cambridge Zoology student in 1986, I remember Grimstone’s repeating this.
- ⁶⁸ Slack to Gaze, 18 March 1986, ‘1985-06 Minutes and papers’, COBSA; quotations from Slack to author, 1 and 5 March 2025.
- ⁶⁹ Gardner interview.
- ⁷⁰ Zoom interview with Keith Roberts, 10 April 2025; further: ‘Plant developmental biology: an editorial statement’, *Development* **100** (1987), 179.
- ⁷¹ ‘JEEM is changing’ (ad), *J. Embryol. Exp. Morphol.* **98** (November 1986), back matter.
- ⁷² ‘Development: an editorial statement’, *Development* **99** (1987), 1.
- ⁷³ Wylie, ‘Changes to JEEM: an interim report (14th September 1986)’, ‘1986-10 Board minutes and papers’, COBSA; further: Wylie, 1986.
- ⁷⁴ Minutes, ‘1986-07 Board minutes and papers’, COBSA.
- ⁷⁵ Note on ‘Item 6: Financial consequences of proposed editorial arrangements for JEEM’, *ibid.*
- ⁷⁶ Zoom interview with Doug Melton, 29 April 2025.
- ⁷⁷ ‘Development: an editorial statement’.
- ⁷⁸ Wylie, ‘Changes to JEEM’.
- ⁷⁹ ‘Development: an editorial statement’. A Development Travelling Fellowship, proposed by the American editors (Wylie (for the editors), ‘Development 1988: editors’ report, March 1989’, ‘Board papers - Apr 1989’, COBSA), was designed to promote that benefit.
- ⁸⁰ Wylie (for the editors), ‘Development 1987: editors’ report, January 1988’, ‘Board papers-Jan 1988’; ‘Development 1991 editors’ report’, ‘1992-04 minutes and papers’; ‘Development: editors’ report for 1994’, ‘1995-04 Board minutes and papers’, COBSA.
- ⁸¹ Wylie, ‘Development 1988: editors’ report’; ‘Development: editors’ report for 1994’.
- ⁸² Wylie (for the editors), ‘Development: editors’ report for 1993’, ‘1994-04 Board minutes and papers’, COBSA.
- ⁸³ Melton interview.
- ⁸⁴ Wylie (for the editors), ‘Development 1989: editors’ report, April 1990’, ‘Board papers Apr 1990’; ‘Development 1992: editors’ report’, ‘Apr 1993 Board minutes and papers’, COBSA.
- ⁸⁵ Wylie, ‘Development 1988: editors’ report’.
- ⁸⁶ Roberts interview.
- ⁸⁷ ‘Development and Journal of Cell Science’ (ad), *Development* **105** (January 1989), front matter.

- ⁸⁸ [Prices and circulation of biological journals 1992], ‘Apr 1993 Board minutes and papers’, COBSA.
- ⁸⁹ ‘COB accounts data’, ‘1994-06 Board papers’, COBSA.
- ⁹⁰ Wylie (for the editors), ‘Development – the first six months: editor’s report June 1987’, ‘1986-07 Board minutes and papers’, COBSA.
- ⁹¹ David Hopwood, conversation, 5 February 2025.
- ⁹² Wylie, ‘Development 1987: editors’ report’.
- ⁹³ Also as ‘The world’s leading developmental journal’ (ad), *Development* **113** suppl. 1 (1991), back matter.
- ⁹⁴ Wylie to author, 5 April 2025.
- ⁹⁵ ‘Survey of data on competing journals’, ‘1995-04 Board Minutes and papers’, COBSA.
- ⁹⁶ Peter Bryant to Joseph Varner (SDB president), 17 June 1987, SDB Records, Center for Biological Sciences Archives, Special Collections, University of Maryland, Baltimore County, collection 22 (hereafter **SDBR**), box 6, folder 32; Steven Dowling (Academic Press) to Anthony Mahowald and Bryant, 3 May 1988, *ibid.*, box 35, folder 48.
- ⁹⁷ ‘SDB: proposed budget for 1989’ and Mahowald to SDB members, 9 February 1989, SDBR, box 2, folder 15. Mahowald explained that the SDB board, convinced that ‘one of the important hallmarks of the currently most influential journals has been their reasonable cost so that many faculty, postdoctoral fellows and even graduate students have purchased their own copies’, had negotiated a substantially reduced price with Academic Press on condition that subscription become compulsory with membership. The consequent quadrupling of the membership fee caused about half the members to leave and subscription was made voluntary again.
- ⁹⁸ Skaer to Bryant, 28 November 1987, SDBR, box 6, folder 32; Skaer to Bryant, 21 December 1988; Jayne Sutton to Holly Schauer, 15 February 1989; Evelyn Sasmor (AP) to Jim Smith (BSDB), 16 December 1988, *ibid.*, folder 41.
- ⁹⁹ Bryant to Varner, 17 June 1987.
- ¹⁰⁰ ‘Society for Developmental Biology, Inc., Minutes of board meeting at San Diego, CA, December 9, 1990’, SDBR, box 2, folder 18.
- ¹⁰¹ Interview with Olivier Pourquié, Boston, 24 October 2023; further: Pourquié 2012a, b.

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Figures

Fig. 1. Editorial board and information about the journal from the first issue of the *Journal of Embryology and Experimental Morphology* in January 1953. Note the European board and that papers could be published in French and German as well as English (until 1972). The presence of the human embryologists J. D. Boyd and W. J. Hamilton is striking; Gavin de Beer perhaps figured more as head of the UCL subdepartment than for his evolutionary interests. Honor Fell and Sidnie Manton were the only women.

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Fig. 2. Flyer for JEEM, likely from 1969. The emphasis is on plants, experiment, biochemistry and biophysics, as well as on the Company of Biologists and the Editorial Board. The 'Information about the journal' revised the following year conveyed a similar message more generally and elegantly. J. Z. Young Papers, J Z Young/H/J, UCL Special Collections, UCL Archives, London, folder 'Journal of Experimental Morphology'.

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9/20

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Fig. 3. Change in JEEM covers compared with Cell: A) Journal of Embryology and Experimental Morphology, February 1978; B) redesign to highlight ‘the word “JEEM”’, January 1979; C) Cell, showing *Drosophila* abdominal muscles from a paper by JEEM editor Peter Lawrence, from Cell **45**, 23 May 1986, by permission of Elsevier; D) Development, June 1987, advertising interest in plant development by showing a germinating pea, *Pisum sativum* cv. Meteor, the only one of hundreds to produce a root growing in the opposite direction to the shoot (photo by Jeremy Burgess). The cover dropped the reference to JEEM in May 1988.



Fig. 4. Years in covers, A) JEEM in 1986; B) Development in 1990. The contrast shows the shift through the revamp to changing colour photos, previewed by the supplement (BSDB symposium volume), as well as from two-monthly to monthly issues. The note in November 1986 states, ‘JEEM is changing its name to Development in 1987 and will appear in larger double-column format.’ From Development, Issue archive, <https://journals.biologists.com/dev/issue-covers/year/1986> and <https://journals.biologists.com/dev/issue-covers/year/1990>, accessed 22 October 2025.

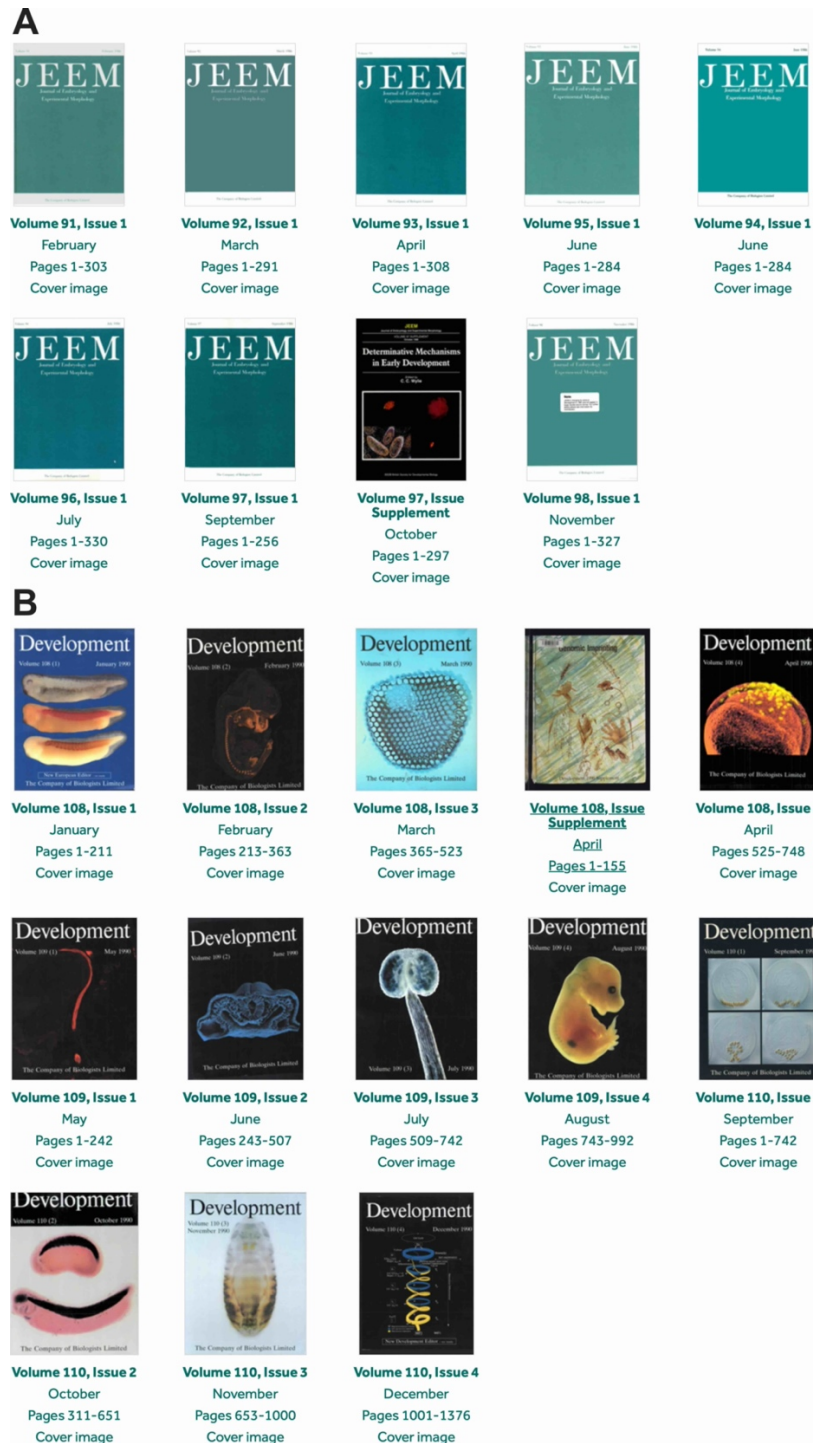


Fig. 5. 'Development for pattern formation', possibly the first poster produced to advertise Development. From a poster for an exhibition in Venice, it was surely artist and art connoisseur Richard Skaer's idea. Most posters would show embryos, but another, from about 1992, features a silvered brass panel by Margaret Macdonald Mackintosh from 1899. Author's collection.



Fig. 6. Changes in institutional and individual subscribers for Development, JCS and JEB in 1985–1991. As well as the main effect, on personal subscriptions, the relaunch of Development halted the decline in institutional ones. ‘1992-04 minutes and papers’, Company of Biologists SharePoint archive.

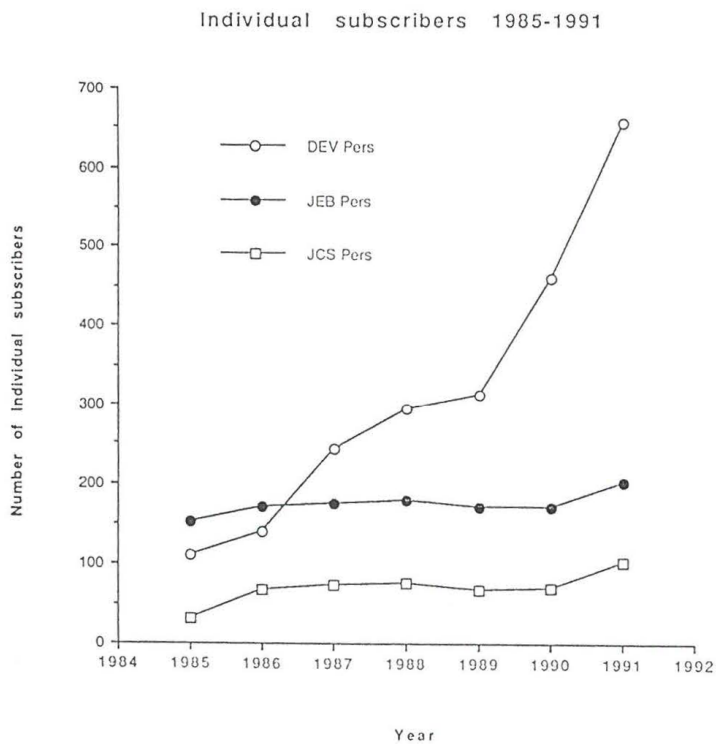
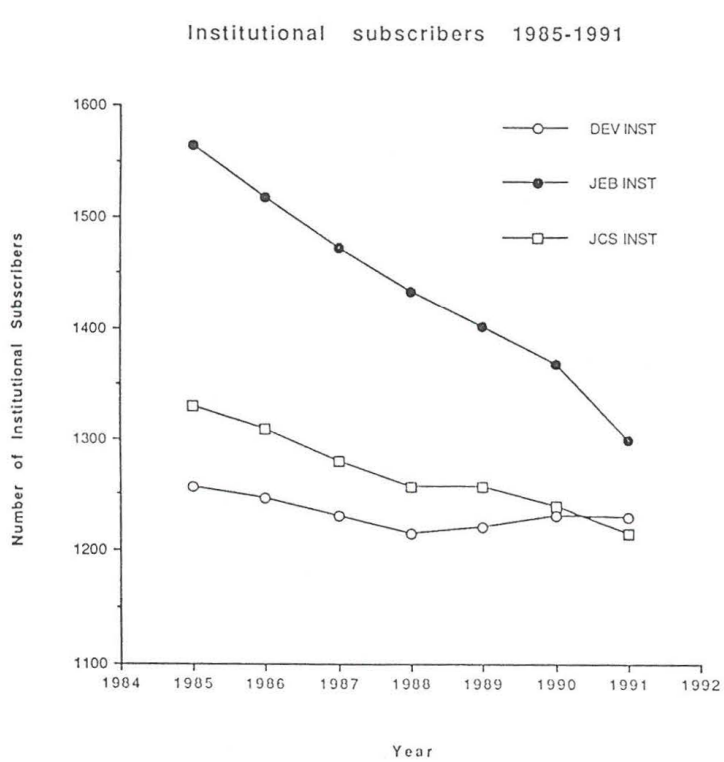
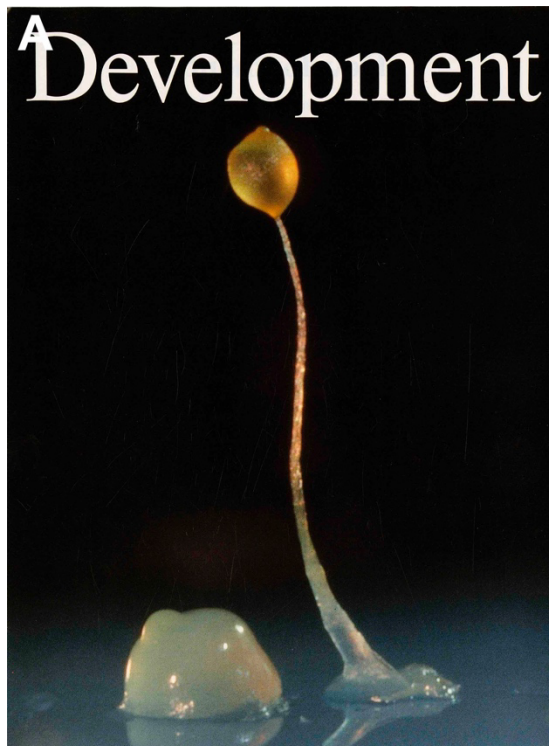


Fig. 7. Competing flyers for A) Development, showing (right) a fruiting body of the slime mould *Dictyostelium discoideum* and (left) the mass of cells from which this differentiates, as on the May 1988 cover (photo by Rob Kay); B) Developmental Biology, showing 'a sea urchin sperm, its plasma membrane labeled with colloidal gold, approach[ing] the oocyte surface', as on the January 1989 cover (from an article by Frank J. Longo), by permission of Elsevier. The citation and impact factor claims were based on data for 1984–1986 (Garfield, 1988). Society for Developmental Biology Records, Center for Biological Sciences Archives, Special Collections, University of Maryland, Baltimore County, collection 22, box 35, folders 52 and 50.



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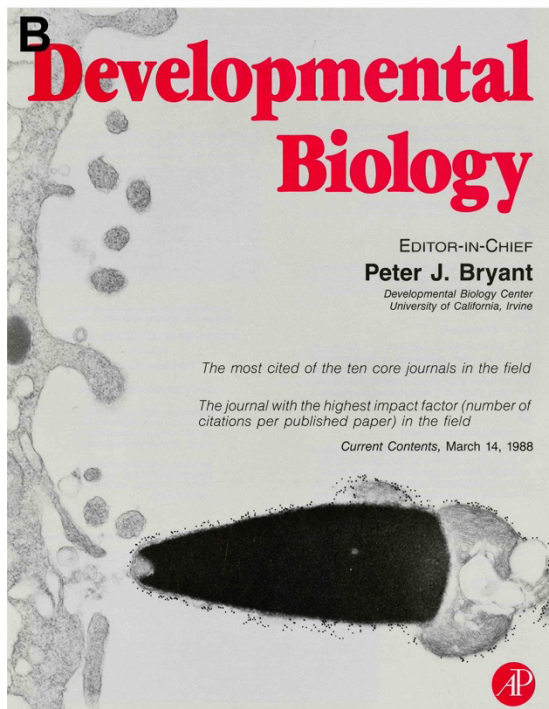
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Table 1. Primary research journals in embryology and developmental biology. A small wave of foundations in 1950–1960 was followed by another of renaming to include the word ‘development’ (titles in bold). I include only the first of the anatomy journals that explicitly claimed embryology and omit general journals in zoology, biology, veterinary anatomy, neuroscience and clinical medicine and specialized ones in gametology, teratology, reproduction and stem cell biology. Titles in italics are predecessors or successors in other fields. Publishers show a strong trend to commercial conglomeration with the survival of a few non-profits.

Date Title	Publisher	Owner (where different) or society affiliation
1875 Zeitschrift für Anatomie und Entwicklungsgeschichte 1877 Archiv für Anatomie und Physiologie (Anatomische Abtheilung) = Archiv für Anatomie und Entwicklungsgeschichte 1921 Zeitschrift für Anatomie und Entwicklungsgeschichte 1974 Anatomy and Embryology 2007 <i>Brain Structure and Function</i>	Veit Springer	
1894 Archiv für Entwicklungsmechanik 1923 Archiv für mikroskopische Anatomie und Entwicklungsmechanik 1925 Wilhelm Roux’ Archiv für Entwicklungsmechanik der Organismen 1976 Wilhelm Roux’s Archives of Developmental Biology 1986 Roux’s Archives of Developmental Biology 1996 Development, Genes and Evolution 2025 Discover Developmental Biology	Engelmann Springer	1984–1990 Organ of the European Developmental Biology Organisation
1915–1966 Contributions to Embryology	Carnegie Institution of Washington	
1937 Growth: A Journal for Studies of Development and Increase 1963 Growth: A Journal Devoted to Problems of Normal and Abnormal Growth 1988–2008 Growth, Development & Aging	Growth Publishing Company	1941–1954 Organ of the Society for the Study of Development and Growth
1942 Jikken keitaigaku nenpō (Annual review of experimental morphology) 1948 Jikken keitaigaku (Experimental morphology) 1954 Jikken keitai gakushi (Annual journal of experimental morphology) 1968 Hassei seibutsugaku shi (Japanese journal of developmental biology) (merged into Embryologia)	Jikken keitai gakkai Nihon hassei seibutsu gakkai	Japan Society of Experimental Morphology
1950 Embryologia	Biological Institute, Nagoya University 1956 Embryologia Society 1963 Japanese Society of Developmental Biologists	

1969 Development, Growth and Differentiation	(Blackwell, Wiley-Blackwell, Wiley)	
1953 Journal of Embryology and Experimental Morphology (JEEM)	1953 OUP 1962 CUP 1983 Company of Biologists	Company of Biologists
1987 Development		
1959 Developmental Biology	Academic Press 2001 Elsevier	1966 Society for Developmental Biology
<i>1952 Anales de Anatomía</i> 1960 Anales del Desarrollo 1989 International Journal of Developmental Biology	University of Granada Press UBC Press	
1970 Ontogenez Translated as Soviet Journal of Developmental Biology 1992 Russian Journal of Developmental Biology	Nauka Consultants' Bureau Springer, Kluwer, 2005 Pleiades (Springer)	
1972 Cell Differentiation 1988 Cell Differentiation and Development 1990 Mechanisms of Development 2021 Cells & Development	North-Holland (Elsevier) Elsevier	International Society of Developmental Biologists
1973 Differentiation	1973 Macmillan 1975 Springer 2000 Blackwell 2003 International Society of Differentiation 2008 Elsevier	International Society of Differentiation
1979 Developmental Genetics 2000 genesis: The Journal of Genetics and Development	Liss 1990 Wiley-Liss 2012 Wiley	
1987 Genes & Development	Cold Spring Harbor Laboratory Press	Genetical Society of Great Britain (2002 Genetics Society)
<i>1901 American Journal of Anatomy</i> 1992 Developmental Dynamics	<i>1908–1979 Wistar Institute of Anatomy and Biology</i> <i>1980 Liss</i> <i>1990 Wiley-Liss, Wiley</i>	<i>1980–1989 Wistar Institute</i> American Association of Anatomists
1999 Evolution and Development	Blackwell 2008 Wiley	

2001 Developmental Cell	Cell Press (Elsevier)	
2001–2021 BMC Developmental Biology	Springer	
2010 EvoDevo 2026 Developmental Biology Advances	BioMed Central (Springer)	