When it comes to sexual selection, there is nothing more vibrantly Darwinian than a Busby Berkeley line-up of tap-dancing chorines in exotic costumes, beating out a rhythmic melody in an overt sexual display of bare flesh, flashing legs and seductive smiles. The lyrics of Berkeley's songs were just as explicit. The hit number 'Pettin' in the Park' from Gold Diggers of 1933 said it all. 'Pettin' in the park', the hero croons suggestively. 'Bad boy!' a woman responds with a playful rebuff. Kaleidoscopic patterns, beautiful geometric designs, fertility motifs, assembly-line precision—these are the hallmark features of a classic thirties Busby Berkeley dance sequence from films such as 42nd Street, Gold Diggers of 1933 and Dames. Berkeley, who played a crucial role in the establishment of the Hollywood musical as a genre in its own right, is most famous for his design of complex, decorative musical pieces that starred large numbers of chorines or showgirls whose performances on screen appeared to obey a series of laws based on geometric patterning. Determined to exploit the artistic properties of the new medium, he explored the power of the moving camera, the effects of framing shots and unusual angles, kaleidoscopic vision and the possibilities of constructing different spectatorial positions.²

Rising to prominence during the Great Depression, the musical was a huge crowd pleaser—an instance of popular entertainment at its best. Critics and theorists, however, have looked for deeper meaning in Berkeley's musical extravaganzas, which they have interpreted from a number of perspectives. A popular approach is to evaluate the musical in relation to gender, class and race.³ A more specialised perspective has been adopted by those who have analysed his films in the context of machine art and the values of utility, streamlining and modern design.⁴ Stylistically, the Busby Berkeley musical represents both art deco and the new style of streamlining, which has been associated stylistically with eugenicist values of the 1930s.⁵ Some critics have pointed to the way Berkeley's films epitomise the context of a new spirit of collectivism— as distinct from traditional American individualism—which developed in response to Roosevelt's New Deal.⁶ Theorists have argued that the Hollywood musical, as a genre, is primarily about 'escapism', 'utopianisms' and 'entertainment', all of which are seen as positive...
values. The theories of Freud and Marx have proven useful in the above analyses of the Depression-era musical, but virtually nothing has been written that draws on a Darwinian approach to these texts. This is surprising given that Darwin himself wrote on the role of dance and music in animal and, by extension, human courtship.

Musical tones and rhythm were used by our half-human ancestors, during the season of courtship, when animals of all kinds are excited not only by love, but by the strong passions of jealousy, rivalry and triumph ... We can thus understand how it is that music, dancing, song, and poetry are such very ancient arts.

Darwin disagreed with Spencer that ‘the cadences used in emotional speech afford the foundations from which music has been developed’ (pp. 638–9, note 39). Instead, Darwin argued that human speech developed from music and that ‘musical sounds afforded one of the bases for the development of language’ (p. 639). He argued that music not only preceded speech but was in fact the origin of speech. The beginnings of music thus lie in sexual display and sexual selection.

I conclude that musical notes and rhythm were first acquired by the male or female progenitors of mankind for the sake of charming the opposite sex. Thus musical notes became associated with some of the strongest passions an animal is capable of feeling, and are consequently used instinctively, or through association, when strong emotions are expressed in speech. (p. 639, note 39)

In Darwin’s view ‘the vocal organs were primarily used and perfected in relation to the propagation of the species’ (p. 632). In his chapter on voice and music, Darwin refers to a large number of non-primate species in which both male and female (or only the female) use their vocal organs in pursuit of a mate; these include frogs and toads, male alligators, fish, various crustaceans, insects, gnats, spiders and birds. Mammals similarly use their voice during the mating season but with mammals, such as the gibbon, it is usually only the male. Even mice are known to sing during courtship. Darwin cites a letter from a colleague who describes a mouse who ‘had no ear for time, yet she would keep to the key of B (two flats) and strictly in a major key ... Her soft clear voice falls an octave with all the precision possible; then at the wind up, it rises again into a very quick trill on C sharp and D’ (p. 634).

Displaying characteristic acumen about what might please audiences, Hollywood created a unique cinematic genre, developed from the stage, with the aim of creating elaborate visual scenarios of song and rhythm designed to explore the sexual desires of the human species. In my view, the Hollywood musical is essentially a mating ritual in which the sexes meet and impress each other with their spectacular song and dance routines as a prelude to mating. The narrative of courtship and marriage is such an ‘obvious’ element of the musical it has rarely, if ever, been analysed in terms of sexual selection and its parallels with the rituals of other species.

In recent years theorists and writers have turned their attention to interdisciplinary studies in the sciences and arts, particularly the influence of Darwinian theories concerning evolution, the emotions and sexual selection and the influence of these on literature, painting and the visual arts. Dame Gillian Beer’s ground-breaking 1983 work, Darwin’s Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction was followed by other important studies of the influence of Darwin’s ideas on literature by writers such as George Levine and Joseph Carroll. Theorists and art historians such as Linda Nochlin, Jonathan Smith, Jeanette Hoorn, Barbara Larson, Sabine Flach...
and Fae Breuer have written on the impact of Darwinian ideas on the visual arts. The most recent work, *Darwin and Theories of Aesthetics and Cultural History* examines the intersection of Darwin’s ideas with theories of aesthetics. To date, however, there has been very little written on the influence of Darwinian ideas on the cinema. In *Darwin’s Screens*, I argue that Darwin’s theories of evolution, sexual selection, deep time, chance and entanglement influenced the evolution of early film genres through a significant number of stage and literary adaptations as well as through public fascination with evolutionary theory. Many writers, whose works were adapted for the screen with great success, acknowledged the influence of evolutionary theory on their thinking; these include Robert Louis Stevenson (*The Strange Case of Dr Jekyll and Mr Hyde*), H. G. Wells (*The Island of Doctor Moreau*), Sir Arthur Conan Doyle (*The Lost World*), Jules Verne (*Journey to the Centre of the Earth*) and Edgar Rice Burroughs (*The Land That Time Forgot* and *Tarzan of the Apes*). Darwin’s ideas about the nature of time, metamorphosis and transformation also influenced early cinema in its development of special effects technology. This is particularly true of the special technology developed to represent the remarkable transformation scenarios in *Dr Jekyll and Mr Hyde* (Mamoulian, 1932). Darwin’s interest in photography and visual transformation gave him what is best described as a ‘pre-cinematic eye’. In his discussion of Darwin’s use of photography, Phillip Prodger writes: ‘Darwin’s photographs have proved inspirational to generations of artists, and may even have fuelled the invention of motion pictures’. While *Darwin’s Screens* primarily explores genres, such as science fiction, horror, the detective film and film noir, which focus on the dark side of human nature, this essay takes a lighter approach in its discussion of the early musical. I am not arguing that the creators of the musical were directly influenced by Darwinian ideas (although they may have been) but rather that the musical by its very nature, that is, its focus on sexual display and sexual selection, is powerfully aligned with evolutionary ideas.

The musical is, in essence, an evolutionary narrative of bodily display and sexual selection. It is a Darwinian mating ritual based on song and dance in which pair bonding, family and future succession are the key elements. It is also Darwinian in its emphasis on motifs of abundance, fluidity and fruition and in its endorsement of the importance of struggle in daily life—motifs discussed by Gillian Beer as central to Darwin’s theory of evolution. The successful couple is the one that strives to achieve, to stand out from the group, to sing and dance with the greatest flair and distinction. Through an analysis of the musical as an evolutionary ritual and the similarities between the sexual display and mating rituals of birds and humans, I will also demonstrate that it is possible to destabilise the anthropocentric point of view that is central to the cinema and by implication other forms of representation. As Margot Norris convincingly argues, the Darwinian revolution in ideas resulted in a ‘subversive interrogation of the anthropocentric premises of Western philosophy and art’.

**THE MATING ANTICS OF BIRDS**

Darwin’s detailed research into the mating rituals of the bird world reveals a number of parallels with Hollywood’s representation of mating rituals in the popular musical. Both human and bird species place utmost importance on the aesthetics of sexual display as a prelude to sexual selection and procreation. There are also key differences in terms of display and selection. Amongst birds, it is the male who is the more beautiful and the male who performs elaborate acts of sexual display. Some species such as the Australian bowerbird even erect elaborate stages on which to perform. In contrast to the human, the females of most bird species do not present themselves as objects of sexual display, nor do they sing or dance to attract the male. The females are the observers, sometimes sitting together in rows to watch the male go through his act. Some male birds create instrumental sounds to accompany their dances. Some species mate for life and become visibly distressed if separated from their partner.
Darwin describes the male birds’ fantastic attributes and powers of attraction in great detail in *The Descent of Man*:

They charm the female by vocal or instrumental music of the most varied kinds. They are ornamented by all sorts of combs, wattles, protuberances, horns, air-distended sacks, top-knots, naked shafts, plumes and lengthened feathers gracefully springing from all parts of the body. The beak and naked skin about the head, and the feathers, are often gorgeously coloured. The males sometimes pay their court by dancing, or by fantastic antics performed either on the ground or in the air ... On the whole, birds appear to be the most aesthetic of all animals. (p. 407)

Darwin’s comment that—apart from the human—birds are ‘the most aesthetic of all animals’ relates to his belief that beauty plays a crucial role in natural selection and that birds, along with other creatures, possess an aesthetic sense. The females choose the most beautiful males, whose gorgeous colours or distended plumes have gradually evolved over time in response to the workings of natural and sexual selection. According to Jonathan Smith, Darwin himself did not elaborate in full on the implications of his theory of aesthetics. This was done by Grant Allen in his book, *Physiological Aesthetics* (1877).

Synthesizing Darwin’s work on mate-selection in animals and the evolutionary relationship between flowers and insects with the physiological psychology of Spencer and Alexander Bain and the physiology of sight and hearing most closely associated with Hermann von Helmholtz, Allen argued that aesthetic feelings have a physical basis, are a product of natural and sexual selection, and thus are not unique to humans.

As Darwin noted, male birds sing and dance and in some instances create instrumental music to attract the females:

We have as yet spoken only of the voice, but the males of various birds practise, during their courtship, what may be called instrumental music. Peacocks and Birds of Paradise rattle their quills together. Turkey-cocks scrape their wings against the ground, and some kinds of grouse thus produce a buzzing sound. (p. 424)

Some species even erect elaborate stages on which to perform their ‘love-antics’. The parallel with the musical in this instance is striking:

But the most curious case is afforded by three allied genera of Australian birds, the famous Bower-birds—no doubt the co-descendants of some ancient species which first acquired the strange instinct of constructing bowers for performing their love-antics. The bowers which, as we shall hereafter see, are decorated with feathers, shells, bones, and leaves, are built on the ground for the sole purpose of courtship, for their nests are formed in trees. (pp. 430–431)

Male birds also seek to impress and some are highly aware of the female audience for whom they perform. According to Darwin, the males of many species strut before the females, displaying their beautiful plumage. The female pea-fowl of India sit in rows of twenty to thirty watching ‘the males displaying their gorgeous trains, and strutting about in all the pomp of pride before the gratified females’ (p. 445). Some males actively seek the gaze of the female:

The Gold and Amherst pheasants during their courtship not only expand and raise their splendid frills, but twist them, as I have myself seen, obliquely towards the female on whichever side she may be standing, obviously in order that a large surface may be displayed before her. They likewise turn their beautiful tails and tail-coverts a little towards the same side. (pp. 446–448)

The most marked difference between human and animal courtship rituals is that it is almost always (particularly in the bird world) the male who is the most beautiful and the one who puts himself on display. It is the female, Darwin
argues, who selects her mate from amongst the most impressive males:

When the sexes differ in beauty or in the power of singing, or in producing what I have called instrumental music, it is almost invariably the male who surpasses the female ... It is the male alone who elaborately displays his varied attractions, and often performs strange antics on the ground or in the air, in the presence of the female. (p. 455)

In human societies, however, he notes that it is usually the male who chooses and the female who practices the art of adornment. In the mating rituals of the musical, this gender division is not as clear cut, although Darwin's comments on this matter generally hold true.

In the early musical both male and female wear costumes and decoration, but the costumes of female performers are more elaborate. Although both sexes partake of the ritual itself—dancing, singing and performing on stage—in the Busby Berkeley musical, the visual emphasis is on the female chorus line (fig. 1). Not only do the women knowingly put themselves on display (smiling and winking at the camera and spectator) but the sexual parts of their bodies are eroticised as in, for instance, the controversial 'crotch shot'. Nonetheless, despite these differences, the parallels between the mating rituals of birds in the wild (and often in captivity) and the staged rituals of humans are striking.

In addition, Berkeley created what became known as the kaleidoscopic shot in which he creates beautiful geometric patterns, based on stylised arrangements of the female body. Writers tend to dismiss these as visually stunning but of little significance. A close analysis of the kaleidoscopic shot, however, reveals many are intended to represent images of the female reproductive systems and abstract patterns signifying scenes of insemination. Berkeley's kaleidoscopic shot is a visual representation of evolutionary aesthetics par excellence. Beauty is not there simply to delight the viewer but to arouse the viewer through coded images of sexual display. Consciously or otherwise, Busby Berkeley adopted an evolutionary approach to the musical, sometimes drawing clear parallels between the natural and human worlds, as in the amorous monkey scene in Gold Diggers of 1933, the scene of a cascading waterfall of women in Footlight Parade (1933), the frisky pettin' scene with cats, also in Footlight Parade, and the spectacular ornamental head display of Carmen Miranda's ‘tutti-frutti’ hat in The Gang’s All Here (1943). Carmen Miranda's exotic fruit-laden top-knot offers a wonderful instance of evolutionary aesthetics at its best.

42ND STREET

Directed by Lloyd Bacon, 42nd Street (1933) is generally regarded as the film that revived and reinvented the musical genre. Its success was largely due to Berkeley, who staged and directed the dance sequences. A Broadway-style musical comedy, 42nd Street epitomises 'The Show Must Go On' style of musical that came to fruition during the Great Depression. A classic Darwinian tale of struggle, survival and
success, *42nd Street* tells the story of Broadway director Julian Marsh (Warner Baxter), who despite ill-health is determined his next venture, *Pretty Lady*, will be a winner. Having lost everything in the Wall Street crash, he is desperate to succeed. He pushes the performers past the point of exhaustion, but they keep coming back for more. Broadway is represented in the film as a symbol of what makes America great: hard work, cooperation and an overriding desire to succeed. Marsh tells his hand-picked group of chorines that he will transform them from an unfit, unruly bunch into an accomplished professional chorus line capable of reaching the heights of perfection. They will achieve this feat through the sheer power of practice and work.

The heroine, newcomer Peggy Sawyer (Ruby Keeler), who is in the chorus, gets her big chance when the star, Dorothy Brock (Bebe Daniels), breaks her ankle. The question is: Does Peggy have the talent to succeed? Will she impress the hero with her display of beauty, song and dance? The pace is fast and furious and the characters quip and quarrel but, once on stage, co-operation and harmony prevail. Made before the institution of the Production Code (1934), the film contains jokes about prostitution; morals appear relaxed and costumes in some scenes almost non-existent. Just before Peggy, clearly suffering from nerves, goes onstage on the opening night, Marsh delivers a fiery speech designed to shock her into giving her last drop of blood to make the show a success.

Now Sawyer, you listen to me and you listen hard. Two hundred people, two hundred jobs, two hundred thousand dollars, five weeks of grind and blood and sweat depend upon you. It’s the lives of all these people who have worked with you. You’ve got to go on, and you have to give and give and give ... Sawyer, you’re going out a youngster, but you’ve got to come back a star.

Marsh’s exhortation emphasises the crucial importance of qualities with an evolutionary advantage such as youth, energy, mutual aid, work and determination. This will be Marsh’s final show; he belongs to an ageing generation, soon to be replaced by a new one. The show must go on with a new team and a new star. The livelihood of individuals and families are at stake, dependent not just on the director, but also on the cast of working girls. While the plot of *Pretty Lady* is fairly thin—a boy-meets-girl tale—its subject matter is ageless.

In *Darwin’s Plots*, Gillian Beer explores the way in which Darwin’s theories influenced and shaped his culture and were simultaneously both adopted and resisted by writers and novelists. She is particularly interested in the way evolutionary theory—given its interest in time and change—affected narrative forms and the nature of fiction. Darwin believed that the principles of variation and change were ever-present in the struggle to survive. He saw life as marked by an ‘inextricable web of affinities’.17 According to Beer the ‘cluster of common contiguous metaphors (tree, family, web, labyrinth) was given a new meaning by his theory’.18 In his writings on sexual selection Darwin quoted Schopenhauer:

No excuse is needed for treating this subject in some detail; for, as the German philosopher Schopenhauer remarks, ‘the final aim of all love intrigues, be they comic or tragic, is really of more importance than all other ends in human life. What it all turns upon is nothing less than the composition of the next generation ... It is not the weal or woe of any one individual, but that of the human race to come, which is here at stake’. (p. 653)

In his writings on sexual selection, Darwin emphasised various complex factors at work: individual desire, beauty, money, family pressures, community values. ‘It began to be asked what emotions, values, and reflex actions help the individual and the race to survive ... What was the role of women, whose progenitive powers physically transmitted the race?’19 These questions influenced the novel, taking the narrative in new directions. According to Beer:

Topics traditional to the novel—courtship, sensibility, the making of matches, women’s beauty, men’s dominance, inheritance in all its forms—became charged with new
difficulty in the wake of the publication of *The Descent of Man*. As so often with Darwin, his writing intensified and unsettled long-used themes and turned them into new problems ... For Darwin love-intrigues and the marriage market involve the future of the human race.  

Beer explores the way in which Victorian novelists responded to the ideas generated by Darwin's theory of sexual selection and his reversal of the role of selector in human affairs, attributing it to the male, as distinct from other species, where it is the female. She suggests that both George Eliot and Hardy 'emphasise the discordance between a woman's individuality and her progenenerative role'. She also examines Hardy's 'post-Darwinian insistence that beauty of body and disposition, as exemplified in *Tess*, provide the only true “standard”'.

Along with the novel, the newest art form—the cinema—was similarly responsive to tales about love and marriage, beauty and wealth, passion, family and children, the roles of men and women, the composition of the next generation and the values most necessary for the successful continuation of the race. Many popular Victorian novels were adapted for the screen during the silent period with Charles Dickens' *Nicholas Nickleby* filmed as early as 1903, *A Tale of Two Cities* (1911), *Oliver Twist* (1922), *David Copperfield* (1923) and many more followed. George Eliot's *The Mill on the Floss* (1915), *Silas Marner* (1916) and *Daniel Deronda* (1921) were classics of the early cinema. Thomas Hardy lived to negotiate screen rights for *Tess of the d’Urbervilles* (1913 and 1924), *Far From the Madding Crowd* (1915), and *The Mayor of Casterbridge* (1921) and was present during parts of the filming. The concerns of Victorian novelists and their narratives of family, romance and future generations, influenced the evolution of early cinema and the development of emerging new film genres. ‘Love intrigues’, as Schopenhauer remarked, constitute the most important drama of all. This certainly is the main theme of the popular Hollywood musical with its staged song-and-dance rituals of sex and pair bonding and marriage.

Just as the Victorian novelist sought to represent traditional topics from a Darwinian perspective, the 1930s musical addressed the problem of *how* to represent sexual display and sexual attraction in the cinema in a modern era of mechanisation. Busby Berkeley’s approach was to choreograph his erotic musical numbers in terms of the new assembly line and the increasingly rapid pace of modern life. As a result, his musical numbers are carried out with assembly-line precision, drawing on kaleidoscopic patterns and exotic geometric designs. The musical number also draws on the aesthetic of display as a form of consumerism—an aesthetic that could be observed in the elaborate and exotic window displays of the new shopping malls. The musical represents sexual display in a thoroughly modernised context—that of a new, curious, and fashion-conscious urban audience.

Darwinian themes of sexual selection are central to the new musical. If we apply a Darwinian perspective to films such as *42nd Street* we are able to make sense of the function of the musical numbers and their place within the narrative as a whole. Such an approach offers a new perspective on the specific roles of the three full-scale production numbers choreographed by Busby Berkeley (usually dismissed by critics as pure spectacle, and lacking any meaning at all): ‘Shuffle Off To Buffalo’, ‘I’m Young and Healthy’ and ‘42nd Street’. In the main, critics view these sequences as stand-alone spectacles in their own right with little direct relevance to the film’s over-all love story and narrative of struggle and success. Critics have rarely analysed the musical numbers as an integral part of the wider narrative about sexual selection, marriage and family. Martin Rubin claims that because the musical genre...
developed from earlier nineteenth-century forms such as vaudeville and burlesque it ‘remains in a state of unresolved suspension between spectacle and narrative, between aggregation and integration’. In relation to the Berkeley musicals of the early 1930s, he argues that this tension is not ‘unresolved’ because ‘the world of numbers is compartmentalized and set apart from the world of the narrative’. Rubin sees the Berkeley musical numbers as constituting an end in themselves: ‘Of crucial importance to the creation of Berkeleyesque spectacle is a sense of gratuitousness, extravagance, over-indulgence, flaunting—of display for the sake of display’. Certainly, display is crucial to the Berkeleyesque spectacle, but display itself is not without meaning. In the musical ‘display’ means something. The musical numbers are about sexual display leading to marriage and the creation of a new generation; the scenes of ‘flaunting’ and ‘extravagance’, designed to attract a mate, are central to Darwinian rituals of pair bonding, descent and generation. In this sense, the musical sequences are carefully constructed visual spectacles designed to demonstrate evolutionary biology at work. The human attributes or qualities that are put on display may vary from decade to decade and in relation to the type of musical genre under consideration, but this does not alter the fact that the musical is primarily a Darwinian ritual of sexual selection. And within this ritual, factors such as familial and social distinction play an important role—as they did in the Victorian novel. (In *Dames*, for instance, the wealthy head of the family even points to a large wall-hanging of the family tree, singling out a particular branch of the family that he intends to excise to prevent the possibility of an unsuitable marriage.)

The opening sequence of *Pretty Lady*, ‘Shuffle Off ’To Buffalo’, is not just an end in itself; rather it stages a key ritual of sexual selection for the human species—the honeymoon. The setting is a train station where the conductor announces that the train’s destination is the popular honeymoon resort of Niagara Falls. Annie (played by Peggy) and her new husband Bert set off on the love train as their friends wave goodbye. On board, Peggy and her partner stand cheek-to-cheek as they sing to each other about what they hope will be a ‘slow’ journey to Buffalo. Song and rhythm play key roles in their courtship.

The honeymoon in store
Is one that you’ll adore
I’m gonna take you for a ride
I’ll go home and pack my panties
You go home and get your scanties
And away we’ll go
Off we’re gonna shuffle
Shuffle off to Buffalo.

The provocative lyrics leave no doubt in the viewer’s mind that the couple plan to engage in slow sex on their journey. As the song and dance sequence continues, the train splits down the middle to reveal an interior view of the sleeper compartments and their mainly female inhabitants, all of whom appear sexually available. The couple skip and dance along the length of the coach. Two of the chorines, Ann and Lorraine, who are sitting in one of the top berths, sing, somewhat cynically, of the dangers of marriage and the inevitability of divorce.

Matrimony is baloney
She’ll be wanting alimony
In a year or so
Still they go and shuffle
Shuffle off to Buffalo.

Women in the modern era not only see through the marriage game, but have earned the right to divorce with a financial settlement. The story told by *42nd Street* is a different story from the Victorian novel, in which women did not have the freedom to leave an unhappy marriage on their own terms. Still, the marriage game must continue even if in a different form.

The next major sequence incorporates the song ‘I’m Young and Healthy’, which is also clearly Darwinian. Here Billy serenades one of the leading chorines (Toby Wing) about his youth, health and virility. ‘I’m full of vitamin A’, he croons. He is a fine specimen who has accrued all of the qualities associated with the workings of successful natural selection over the millennia.
I’m young and healthy
And you’ve got charms
It really is a sin
Not to have you in
My arms.

The Toby Wing figure is also young and healthy: blonde, fleshy and forever-smiling, her parted lips signify her ample ‘charms’. In case the viewer needs this image of ripe womanhood reinforced, Berkeley has designed a rotating wheel composed of dozens of other healthy, blonde and fleshy chorines, all adorned with brides’ bonnets; they rotate smoothly past the crooning male. Lyn Phelan has noted that there is a ‘curious intensification of both female fleshiness and abstract uniformity’ as Berkeley’s camera ‘one moment swoops for a closer look at a chorine’s dimpled knee and the next ascends to the God’s-eye-view provided by the overhead shot that dissolves the individuals into massed kaleidoscopic pattern’. The contrast emphasises the seductive flesh of the individual while also pointing to the way the chorines, seen from a different perspective, form an abstract pattern, almost like a close-up section of a feminised and animated helix of genetic information (fig. 2). Berkeley’s kaleidoscope is a scientific microscope, his scenario a marvel of modern design. This is the future generation that will rebuild America. Success is in the genes. ‘Young and healthy’, vibrant and vibrating—the spectacle of excessive female flesh surrounding the young, healthy and virile male is a testament to the virtues of both natural and sexual selection.
THE MUSICAL AS DARWINIAN MATING RITUAL

Theorists who have written on the Busby Berkeley musical sequence point to its motifs of profusion and excess. In his influential ‘Entertainment and Utopia’, Richard Dyer emphasises the idea of the musical as ‘pure entertainment’ whose performances are designed with ‘the sole (conscious) aim of providing pleasure’. He argues that a central thrust of the musical is utopian and that utopianism is about feelings. Entertainment ‘presents, head-on as it were, what utopia would feel like rather than how it would be organized. It thus works at the level of sensibility’. Dyer argues that the musical employs non-representational signs (‘colour, texture, movement, rhythm, melody, camerawork’) to signify the qualities associated with utopianism. In his analysis of a series of musicals, Dyer organises his discussion around five headings: energy, abundance, intensity, transparency and community. Significantly these categories relate to categories that Beer identifies as central to the new Darwinian worldview: the qualities of abundance, struggle, community, movement and vitality. Dyer cites Berkeley’s Gold Diggers of 1933 as embodying all of these qualities. I agree with Dyer’s proposal that the musical presents the feelings associated with utopianism, but I would add these can also be interpreted as Darwinian. In the musical, Dyer’s ‘non-representational signs’ are those elements that are necessary for the success of the musical mating ritual. In Darwinian terms these non-representational signs—colour, rhythm and melody—also signify a superior mating partner, an individual of the species who is strong, healthy and attractive—that is, someone who is genetically well endowed. The Berkeley musical sequences thus represent a utopian and Darwinian display of sexual prowess, eroticism, cooperation and community. They also place great emphasis on beauty.

It is clear from Darwin’s writings that beauty is essential to sexual selection in both human and animal species. Although Darwin rejected the view that signs of beauty and design in the natural world offered evidence of God’s existence, he did not reject the central role of design in nature. Beer points out that in his Autobiography, Darwin referred to ‘the endless
beautiful adaptations’ in nature and the role of such beauty in sexual selection. Variation and chance lead to permutations and possibilities, but the constant factor is the creation of arresting and beautiful forms whose function is to ensure the perpetuation of the species through sexual selection. He argues that beauty is also subject to evolution and discusses in detail how the beautiful wing patterns of the Argus pheasant have evolved over the millennia. Margot Norris makes the important point that Darwin, ‘displaces the concept of beauty from the realm of the ideal and the spirit and attaches it to the sexual and erotic instincts in humans, animals, and even plants’. Berkeley was also interested in a scientific exploration of beauty, which he sees as a seemingly arbitrary arrangement that can be refigured into a harmonious, symmetrical pattern. He uses the kaleidoscopic shot with spectacular effects in *Gold Diggers of 1933*. Watching a Busby Berkeley musical number is like viewing a breath-taking geometric pattern unfolding in a kaleidoscope. These assume various shapes—a microscopic view of a snowflake or minute cellular organism, a flower opening (fig. 3). Berkeley’s kaleidoscopic shots demonstrate the crucial role of beauty in the dynamics of sexual display and attraction. He demonstrates the way beauty can evolve through the creation of harmonious and symmetrical patterns designed to stimulate the viewer. Berkeley’s musical extravaganzas are distinctly Darwinian in their focus on the values of excess, reproduction, perpetuation and continuation. With its focus on both male and female beauty, early cinema similarly represented beauty from a sexual perspective resulting in the creation of a secularised aesthetic of beauty.

**GOLD DIGGERS OF 1933**

**Busby Berkeley’s most** successful thirties film, *Gold Diggers of 1933*, is also a study of sexual selection at work. The first of four Gold Digger films, *Gold Diggers of 1933* tells the story of four showgirls who are unemployed and broke but determined to put on a show. Directed by Mervyn Le Roy, it again features Berkeley’s extravagant dance spectacles, overhead kaleidoscopic shots and remarkable special effects, including a number involving neon violins and electrical skirts. *Gold Diggers of 1933* further demonstrates how Berkeley was able to modernise the ritual of sexual selection in order to adapt it to the times. *Gold Diggers of 1933* features three spectacular Berkeley numbers: ‘Pettin’ in the Park’, an amorous number about the pleasures of sex; ‘The Shadow Waltz’, a surreal abstract piece of Baroque proportions; and the unusually serious, social justice number, ‘Remember My Forgotten Man’, which features a number of heart-broken women abandoned by their sweethearts whose lives and marriages have been destroyed by war and unemployment.

The musical number that most clearly explores and highlights the film’s Darwinian theme of sexual selection, though, is ‘Pettin’ in the Park’. Even taking its pre-code status into account, ‘Pettin’ in the Park’ is remarkable for its minimal use of costumes and suggestion that the chorus girls were virtually naked. The main focus is on sex and sexual selection as a game. The scene commences with Brad reading a book, *Advice to Those in Love*. The advice is that those who have been working hard all day should relax in the open air and look for a mate. Polly enters and sits beside him nibbling on a sweet from a container labelled ‘Animal Wafers’. He bursts into song with a provocative opening line: ‘Pettin’ in the Park’. ‘Bad boy!’ she replies firmly. ‘Pettin’ in the dark. Bad girl!’ he responds. The procedure is gradually to pet ‘up a little’ and then ‘you get a little kiss’. It is wise to ‘act a little shy’ and ‘struggle just a little’. As Polly responds with her own lines, her eyes open wider and flash seductively. Brad hugs her amorously. She jumps up and breaks into a tap routine in which the rhythmic sounds of her tap-tap accompanied by the flash of her bare legs are clearly intended as indicators of sexual allure. The emphasis on tapping in the musical recalls Darwin’s account of the origins of music. He theorised that the origins of music could be found in the musical notes and rhythms of mating rituals such as the tapping of the woodpecker’s beak and the drumming of the snipe’s tail. The key role played by the tap-dance in the Hollywood musical, accompanied by shots of flesh and tapping feet, suggests...
that the sounds of tapping play a crucial and possibly ancient role in arousing human sexual desire. The action of tapping conveys the impression of a body that is ready for mating—loose, fluid and vibrating. Polly dances for her mate in a scene of erotic foreplay and then they dance for each other. As they move away from the camera, it moves in to focus on Polly's packet of 'Animal Wafers', which reveals two monkeys pettin' in a cage. The image fades to a shot of two actual monkeys hugging, one nibbling the other's face, as the lyrics comment on their pettin' antics. Pettin' it seems is part of the mating rituals of all species. The camera moves around the stage revealing a range of different couples, white and black, old and young, human and animal, all 'pettin' in the park'. The city is barren: the park lush and fertile with possibilities.

The 'Pettin' in the Park' number celebrates the art of sexual display in which human and animal species are depicted as having similar, not different, desires. In Berkeley's view there is an art to pettin' or foreplay that the human species, weighed down by work, the demands of urban life and the threat of unemployment, is in danger of forgetting—hence the title of the new show, Forgotten Melody. The setting for courtship rituals is the wide, open space of the city's park where the pettin' couples are exposed to the vagaries of nature's changing seasons. Playing hard to get ('struggle just a little') is an essential part of human courtship. After the drought comes plenty. The dominant impression of the Berkeleyan spectacle is one of beauty, excess, eroticism and abundance. It is an anti-anthropocentric evolutionary scene in which human and animal alike engage in the erotics of sexual display and sexual selection. Darwin's radical ideas about the continuum between human and non-human animals continued to influence popular culture throughout the twentieth century. In the musical these inform the development of an evolutionary aesthetic.

THE CROTCH SHOT

The Busby Berkeley crotch shot, constructed by a moving camera that literally tracks through the legs of the chorines, has proven highly controversial with critics, some of whom have described it as voyeuristic and exploitative of the female body. Nadine Wills refers to Rick Altman's argument that Busby Berkeley's 'crotch shot' of the female genital area is central to the way in which the musical constructs the 'show as female' and the voyeuristic gaze of the camera as phallic and male. There are however crotch shots of male dancers in Berkeley's musicals, although these are not as numerous. In my view, the Berkeleyesque crotch shot signifies that the dance is definitely a mating ritual. This is why Berkeley draws close visual attention to the genital area (of female and male) through the movement of the tracking camera. Berkeley makes it perfectly clear that the female dancer—like the male Argus pheasant—is on visual display, thrilling her audience with her fantastic antics. He frequently underlines his intention with an inventive scene of abstraction that signifies mating. This is particularly true of the opening number in Dames (1934) in which the chorines present the film's signature number 'Dames'. Their bodies are arranged to form the shape of a long tube or tunnel that suggests a journey through the reproductive pathways of the female body. The fleshy tunnel rotates as we travel through; just as the tunnel shot appears to reach its end the hero breaks through the black space at the back of the tunnel creating an image signifying rupture and fertilisation. In his representation of the human reproductive system in his dance sequences, Busby Berkeley anticipated the dynamics of reproductive design exhibited in General Motors' Futurama display at the New York World's Fair of 1933.

Berkeley generally accompanies the crotch shot with telling lyrics. He uses the shot to great advantage in 42nd Street during the 'I'm Young and Healthy' number. The camera tracks through the legs of the female dancers as the male lead and chorus sings,

I'm full of Vitamin A
Say: I'm young and healthy, so let's be bold
In a year or two or three maybe we will be too old.

The message is clear: the future rests with the younger generation. In the final waterfall
sequence of *Footlight Parade*, Berkeley directs his underwater camera to film the chorines as they tread water. The chorus girls are fully aware of what is happening, of what is on show. In the next shot the bathing beauties dive into the water to smile at the camera (and audience). Wills points out that the ‘knowingness’ of the chorus girls ‘complicates’ the voyeurism of the shot. I agree but it does more: because the girls openly acknowledge the camera’s voyeurism, they render it ineffectual. The underwater crotch shot emphasises that the waterfall extravaganza is primarily about sexual display and sexual selection, procreation, fecundity and the future. The function of the musical as a mating ritual is made abundantly clear in the number from *Dames*, entitled ‘The Girl at the Ironing Board’. Here a group of singing chorines, who work in a laundry, wash and iron a collection of assorted male undies while singing of sex and love. In the final scene, one of the chorines sniffs the male scent that lingers on the material as birds chirp in pleasure. The musical also offers olfactory pleasures to those gripped by the mating urge. Berkeley’s musicals draw attention to the close parallels between species in relation to sexual selection and in so doing help to erode the anthropocentric viewpoint that seeks to separate, not unite, species both human and animal.

In terms of putting on a display nothing exceeds Busby Berkeley’s final sequence in *The Gang’s All Here* (1943). Carmen Miranda’s ‘Tutti Frutti Hat’ number enjoys iconic status in the history of the musical. One of the reasons is its indisputable appeal to an evolutionary aesthetic. The location moves to a desert island where Berkeley’s chorines perform a very humorous and suggestive scene in which they form a long swaying line, each one waving a giant banana (fig. 4). Berkeley then cuts to one of his famous kaleidoscopic sequences in which the girls dip the tips of the bananas into the oval centre of a flower pattern, clearly representing a scene of fertilisation. An early expression of camp sensibility, the final number—in which Carmen Miranda sings
'The Lady in the Tutti Frutti Hat'—has become a celebrated moment in the history of the musical. The scene emphasises the key elements Darwin specified as necessary to attract a mate: evocative singing, rhythm, excess, colour, sounds, movement. The Hollywood musical evokes a mating ritual whose evolutionary aesthetic is shared by all species. As Berkeley's camera pulls back, Carmen Miranda stands at the centre of a phalanx of gigantic bananas looking very much like a Neolithic fertility goddess. Resplendent in her gigantic fruit-laden hat, Miranda would no doubt have inspired awe in Darwin's audience of female birds with their penchant for an elaborate display of 'combs, wattles and top-knots'.

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2. Busby Berkeley directed musical numbers for virtually every important Warner Brothers film produced between 1933 and 1937. Initially Berkeley directed only the musical sequences, but after his amazing success with films such as 42nd Street, Gold Diggers of 1933 and Footlight Parade he directed his own films. His musical extravaganzas were the talk of the thirties.
5. Christine Cogdell in Eugenic Design: Streamlining America in the 1930s (Philadelphia: University of Pennsylvania, 2010) argues that the new influential eugenic ideology was intimately connected with a 1930s design movement in the United States known as ‘streamlining’ or ‘Streamline Moderne’ which developed from, and (some would say) in reaction to, Art Deco. Its style emphasised long horizontal lines and curving forms—the features that suggested the new values of the modern period—aerodynamics, motion and speed. Designers who championed this new style included Norman Bel Geddes, Raymond Loewy and Walter Dorwin Teague. The Futurama exhibit at New York’s World Fair (1939–1940), designed by Bel Geddes, offered stunning displays of streamlining. Cogdell shows how the ideal of eugenics—‘efficiency, hygiene, and the ideal type’—meant that its aims were ‘coincident with deeply rooted ideals in American culture’ (p. x). There is no evidence that Berkeley was at all interested in eugenics; in my view, however, his musicals represent a combination of art deco and the new streamlining style.
8. Darwin, The Descent of Man, pp. 637–38. As this is a principal source for this essay all subsequent page references will be included in the text.


13. Recent research into the mating practices of finches reveals that the females have much more control, even in determining the sex of offspring, than formerly realised. See Bridie Smith, ‘Head colour keeps gender on agenda for female finches’, The Age, 20 March 2009, p. 3.


15. The crotch shot is constructed by a moving camera that literally tracks through the legs of the chorines. See Rick Altman’s essay in Genre: The Musical in which he argues that the female crotch shot is basic to the way in which the musical represents the musical numbers as female and helps to create a voyeuristic gaze.

16. The Production Code (1934) was a form of self censorship whereby Hollywood studios abided by a list of material that they were not permitted to depict such as scenes of miscegenation, sex between adults and scenes in which wrong-doers such as the ‘fallen’ woman or homosexual individual were shown to triumph or enjoy a happy ending. The Code was carefully regulated by the Hays office.


18. Ibid., p. 159.

19. Ibid., p. 196.

20. Ibid., p. 198.


24. Ibid., p. 60.


28. Ibid., p. 35.


30. An ancient instrument, the word ‘kaleidoscope’ is derived from the Greek words, skopos, kalos, eidos which mean ‘view’, ‘beautiful’ and ‘form’ respectively. It was reinvented in 1816 by Sir David Brewster who intended it for scientific purposes. Although the patterns in a kaleidoscope seem to appear magically, the sense of symmetry is attained because the parts are organised in an intricate manner. In many of his carefully orchestrated sequences, Berkeley copies the kaleidoscopic effect to create a ‘kaleidoscopic shot’, which almost always signifies the intricate and beautiful world of nature.

31. Darwin, The Descent of Man, ch. 3.


33. According to Cogdell, Norman Bel Geddes: ‘consciously created a sexual narrative in the architectural layout of the General Motors Futurama at the New York World’s Fair’. Arens did the same in his design for the Hall of Public Health in which fairgoers walked through an ‘architectural re-creation of a female reproductive system’, Christine Cogdell in Eugenic Design, pp. ix, 118.

34. Wills, “110 per cent Woman”, 129.