583; 2001). In *The Secret*, Eva Hoffman's first work of fiction, she probes the psychological impact on a cloned child, and on others around her, of the knowledge of her origins.

The story is narrated by Iris, the cloned daughter of a beautiful, highly successful woman (the cell donor) who has retreated to a leafy midwestern US suburb to bring up her child away from negative influences and prying eyes. Iris's cloistered childhood is characterized by a deep sense of being at one with her mother — this feels natural to both but discomfites everyone else. It is also marked by *The Weirdness*, or ill-defined self-knowledge, and *The Strange Look*, which Iris detects in others, including her mother. Her mother's lover, who was unable to discover the secret of the household, leaves when Iris is in her teens, intensifying her curiosity about her 'real father'. She snoops and discovers that she is a clone.

Iris's now rational awareness of her beginnings pitches her into an emotional void and, after violently rejecting her mother, she sets off in search of her self. Iris's sense of anomie intensifies when relatives from whom she craves love and acceptance are unable to respond to this identical copy of their sister/daughter. Desperate yet defiant, Iris sleeps with her mother's ex-lover. She does ultimately carve out a life for herself but it is devoid of family contact — her identity has been won at great cost.

The message that will be drawn from *The Secret*, whether or not it was intended

by Hoffman, is that cloning has adverse, acute and disturbing effects on the clone's personal development and on family and other social relationships, and should therefore be banned.

But would all instances of human cloning entail deleterious psychological burdens and dysfunctional relationships of the kind described by the author? If Iris had been provided with information in childhood about how she was conceived, would learning that she is a clone be so traumatic? Might not a clone instead feel special in the same way that children born by *in vitro* fertilization reportedly do? If Iris's mother had not been so overprotective, would her child have felt less isolated from, and less different to, her peers? If her extended family had not been opposed to cloning, could she not have had satisfying family relationships in which her own personality was recognizable from early infancy and in which her physiological similarity to her mother preoccupied others less? Do we not have good reason to be suspicious of any man who cannot adequately distinguish emotionally and sexually between his ex-partner and her daughter, whatever 'sameness' exists between the two women? The answers invited by these questions suggest that Iris's experience was not necessarily an inevitable consequence of her cloning origin.

Even if we assume for the sake of argument that all clones would be likely

to face the kind of struggles that Iris does in *The Secret*, is this enough of a reason to ban human cloning? The answer has to be no. If the reasonable prediction of psychological damage, the compromise of autonomy and fraught relationships is weighty enough to support a ban on asexual reproduction, then it must also be weighty enough to support a ban on sexual reproduction. It is mistaken to say that cloning involves harm of a different magnitude, because it can be seen that the welfare of children born by natural procreation is compromised severely and permanently by various behaviours of their parents, as well as by societal attitudes. It may be that no one should be allowed to procreate when it is likely that their offspring will suffer welfare-related harms of the kind discussed. But few people are prepared to stand up and argue this.

Hoffman uses the vehicle of fiction to explore a serious topic. Her strengths as an author lie in her ability to describe dislocation, alienation and individuality against different backdrops; see, for example, her much-acclaimed autobiography, *Lost in Translation*, in which, as a Polish emigrant, she struggles to find a sense of self and place in the New World. However, readers of *The Secret* should exercise caution if they were hoping for a comprehensive psychosocial commentary on the impact of cloning.

Justine Burley is at Exeter College, University of Oxford, Oxford OX1 3DP, UK.

Science in culture

Cosmic opera

Poussières d'Etoiles (Stardust), a multisensory experience in Paris.

Alison Abbott

Technology and imagination act symbiotically in the 'cosmic opera' *Poussières d'Etoiles* (Stardust). Conceived by Philippe Corbin and designed for the cavernous hall of the Cité des Sciences on the outskirts of Paris, it addresses the senses of sight, hearing and smell. With few words, the three-act, anti-anthropocentric show tells us that we are made up of atoms formed in stars that may have died before our Sun was born.

Spectators walk into a complex light show that takes up all 50,000 cubic metres of the hall, and are greeted by a smell of damp earth and sounds that move from pure frequencies to scratching, chattering electronic music. Light images of immense butterflies take wing. The situation is intended to place the spectators outside their normal dimensions and prepare them for their virtual journey from the Big Bang to the creation of life on Earth.

The second act begins with the activation of escalators that carry spectators to luminous sofas on the mezzanine level. Here they lie and

Eye of the beholder: the second act of *Poussières d'Etoiles* shows the development of the Universe.

watch, for 30 absorbing minutes, a breathtaking series of images projected onto the 2,400-square-metre ceiling. Many of the images are from the Hubble Space Telescope. Astronomers may recognize the Horsehead nebula, the Hubble Towers (interstellar clouds) and the Pleiades star cluster, which go by without comment as the Universe develops.

The music, like the Universe, becomes more structured, eventually taking the form of an operatic libretto, although without significant text. The composer, Nicolas Frize, says that the celestial bodies have neither soul nor feeling, so

literal dialogue in a libretto would be out of place.

For the final act, after the Earth has made its first appearance in the virtual heavens, the voices of the choir evolve into drops of water, then torrential rain. The spectators look down the escalator and see the hall submerging in virtual floods as the Earth's primeval oceans fill. They descend to watch the first organic molecules appearing in the oceans, then see life emerging in all its forms. The smell of perfumed humidity, like a sauna, pervades.

The glory of the show lies in the light-handed presentation of the beauty of astronomy and cosmology, which avoids didacticism. Frize's intelligent, evocative and moving music adds fundamentally to the poetry of the second act. But the show's weakness is its clumsy choreography of spectators, who are herded around like confused package tourists, often understanding what they should be experiencing only after the moment has passed.

Alison Abbott is *Nature's* Senior European Correspondent.

Poussières d'Etoiles runs nightly, from Tuesday to Saturday, at the Cité des Sciences in Paris until 2004.