



**TRANSPARENT MINDS
IN SCIENCE FICTION**

**AN INTRODUCTION TO ALIEN,
AI AND POST-HUMAN
CONSCIOUSNESS**

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Paul Matthews, *Transparent Minds in Science Fiction: An Introduction to Accounts of Alien, AI and Post-Human Consciousness*. Cambridge, UK: Open Book Publishers, 2023.

<https://doi.org/10.11647/OBP.0348>

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Digital material and resources associated with this volume are available at

<https://doi.org/10.11647/OBP.0348#resources>

ISBN Paperback: 978-1-80511-046-0

ISBN Hardback: 978-1-80511-047-7

ISBN Digital (PDF): 978-1-80511-048-4

ISBN Digital ebook (epub): 978-1-80511-049-1

ISBN XML: 978-1-80511-051-4

ISBN HTML: 978-1-80511-052-1

DOI: 10.11647/OBP.0348

Cover image: NASA, Nebula, May 4, 2016. <https://unsplash.com/photos/rTZW4f02zY8>

Cover design: Jeevanjot Kaur Nagpal

5. Hive and Distributed Mind

Nothing in the brain of a worker ant represents a blueprint of the social order. There is no overseer or 'brain caste' who carries such a master plan in its head. Instead, colony life is the product of self-organization. The superorganism exists in the separate programmed responses of the organisms that compose it.

Bert Hölldobler and Edward O. Wilson, *The Superorganism*¹

It is one of the most exciting topics in both science and science fiction: minds working in concert, joining, melding and cooperating. Fictional imagination enables the logical extension of the human collaboration we know to an even closer union. Alien races may themselves be conceived as in a natural hive state. But what advantages does a hive organisation bring to consciousness?

In the academic field of distributed cognition, systems of individuals organised to solve problems, make decisions or manage processes are seen to have a wider, emergent intelligence that may not be achieved by the individuals alone or in other combinations.² Emergence is a slightly slippery concept, but it is helpful to think about it in contrast to aggregation: do intelligent or conscious processes fail with disaggregation, addition, subtraction and substitution? Do the parts interact by cooperating or inhibiting one another? If the answers to some of these questions are yes, then there may be emergence.

In the same way that distribution is a relative concept, cognition can also be seen as a continuum. Pierre Poirier and Guillaume Chicoisne

1 Bert Hölldobler and Edward O. Wilson, *The Superorganism—The Beauty, Elegance and Strangeness of Insect Societies*. Illustrated edition (New York: W. W. Norton & Co., 2009), 7.

2 Edwin Hutchins, 'The Distributed Cognition Perspective on Human Interaction', in *Roots of Human Sociality*, eds N. J. Enfield and Stephen C. Levinson, 1st ed., 375–98 (New York: Routledge, 2020). <https://doi.org/10.4324/9781003135517-19>.

propose four conditions: adaptability, information processing, intentionality and consciousness.³ A system may be more or less cognitive depending on how many of these conditions are met by its behaviour. This two-dimensional emergence/cognition scale can then be used to evaluate a variety of systems.⁴ But challenges remain—we may not, for example, recognise emergent properties for what they are due to our own cognitive limits.

Studies of social and emotional behaviour in groups show that humans do naturally show a range of ‘herding’ effects, aligning in various ways based on the feedback received by the individuals around us.⁵ This may include not only synchronisation of movement and posture, but also emotional state and conformity to norms. It is further proposed that the same brain regions are involved in mediating these two capabilities. While clearly a powerful and, in many ways, useful ability, social alignment has been shown to work mostly within in-groups, groups with whom we already identify. As we will see, this might limit future human progress were brains to be even more tightly enmeshed. It is a challenge to the inclusive plurality that might be needed in an effective hive-mind.

Despite these concerns, fictional portrayals of connected minds have often tried to envision ideal and powerful outcomes, where the emergent entity has a unity and equity of consciousness—the ideal Gestalt.⁶ Authors have imagined not only human-human melding but also alien-alien and human-alien connections. But along with this idealism comes the ever-present concern of manipulation and possession, of non-consensual connection leading to loss of control.

3 Pierre Poirier and Guillaume Chicoisne, ‘A Framework for Thinking about Distributed Cognition’, *Pragmatics & Cognition* 14, no. 2 (1 January 2006): 215–34. <https://doi.org/10.1075/pc.14.2.04poi>.

4 Pierre Poirier and Guillaume Chicoisne ‘A Framework for Thinking about Distributed Cognition’, *Pragmatics & Cognition* 14, no. 2 (2006): 215–34. <https://doi.org/10.1075/pc.14.2.04poi>.

5 Simone Shamay-tsoory ‘Herding Brains: A Core Neural Mechanism for Social Alignment’, *Trends in Cognitive Sciences* 23, no. 3 (2019): 1–25. <https://doi.org/10.1016/j.tics.2019.01.002>.

6 See below and for background: <https://www.britannica.com/science/Gestalt-psychology>.

Possession

In the future Earth of Brian Aldiss's 1962 *Hothouse*, humans are a much denuded and reduced species, with vegetal intelligence having evolved to compete for dominance. They include a morel fungus that attaches to the human protagonist Gren as a parasite:

'You are human', said a voice. It was a ghost of a voice, an unspoken voice, a voice that had no business with vocal chords. Like a dusty harp, it seemed to twang in some lost attic of his head.. 'You call me morel. I shall not leave you. I can help you.' He had a detached suspicion that the morel had never used words before, so slowly did they come.⁷

Gren's attitude to the morel is subtly ambivalent. He recognises the superior knowledge and drive of the fungus while being conscious of being manipulated—sometimes against his will. The fungus is similarly ambivalent toward its host, showing a promiscuous interest in a sea creature they encounter:

'Do as I tell you', twanged the morel. Always in the back of its mind lay its basic purpose, to propagate as widely as possible. Although this human had at first seemed by reason of its intelligence to hold promise as a useful host, it had hardly come up to expectations; a brute of mindless power such as they had just seen was worth investigation. The morel propelled Gren forward.⁸

This possession by Aldiss's morel has a real biological basis on our earth, that of host manipulation by parasites. This is seen in a number of species such as the zombie ant fungi, which manipulates ants to release fungal spores, or the *Toxoplasma apicomplexan*, a microbe that fatally attracts mice to cats. In some cases, these parasites directly attach to the hosts' brain, while in others they use a manipulative venom.⁹ In humans, while there is no directly manipulative parasite, there is growing evidence that gut microbes can influence our behaviour and impact both cognitive function and social interaction behaviour.

7 Brian Aldiss, *Hothouse* (London: Four Square Books, 1964), 70.

8 *Ibid.*, 119.

9 David Hughes and Frederic Libersat 'Parasite Manipulation of Host Behavior', *Current Biology* 29, no. 2 (2019): R45–47. <https://doi.org/10.1016/j.cub.2018.12.001>.

Peter Watts also attempts to get inside the mind of a quasi-parasitic species in his short story 'The Things', a retelling of John Campbell's 1938 novella *Who Goes There?* (the latter perhaps better known as the 1982 film *The Thing* by John Carpenter). Watts presents the alien's point of view, where what was originally portrayed as a horrific possession of the human explorers is recast as a simple desire on the part of the alien to adapt and assimilate, to regain its former glory:

I was so much more, before the crash. I was an explorer, an ambassador, a missionary. I spread across the cosmos, met countless worlds, took communion: the fit reshaped the unfit and the whole universe bootstrapped upwards in joyful, infinitesimal increments.¹⁰

The alien finds the human 'Things' incomprehensible in their insularity and hierarchical vulnerability, failing to reach them in the way it had succeeded with so many other species: 'They've never known communion, can aspire to nothing but dissolution. The paradox of their biology is astonishing, yes: but the scale of their loneliness, the futility of these lives, overwhelms me.'¹¹ The alien is further diminished, but not defeated, resolving to continue its work by stealth.

A further parasitic possession scenario is seen in Adrian Tchaikovsky's *Children of Ruin*, with a xenomorph infecting the human explorers of a new planet. The virus-like being inhabits the brain, talking through the body of the host:

'Don't you understand? This give us purpose again. We've been without purpose for so long.. Each day we studied—us. We can be something new.' And the horror of it was, he could believe there was something of Lante [the infected crew member] there, and that what was speaking to him was a kind of pithed and neutered version of his crewmate. *She tells it as she sees it. And I could never know how 'it' sees things..* He did not believe in alien parasites that could instantly converse in the language of their hosts, but he did believe in parasites that screwed over brain chemistry or pulled neural strings, so their hosts believed whatever was convenient to their hidden passenger. *And its learning somehow. It's getting better at manipulating them.*¹²

10 Peter Watts, 'The Things', *Clarksworld Magaine*, January, 2010. https://clarkesworldmagazine.com/watts_01_10/

11 Ibid.

12 Adrian Tchaikovsky, *Children of Ruin* (London: Tor Books, 2019), chap. 8.

While the possession in *Children of Ruin* and ‘The Things’ is ruinous to the human hosts, Aldiss’s portrayal of parasitic manipulation proves survivable. In *Hothouse*, when the fungus fruits, Gren’s companions intercept it as it tries to transfer to Gren’s child. Gren finds himself lonely and limited, though free:

He had travelled through lands and performed actions and above all held knowledge in his mind in ways that would have been unknown to his former free self... quite coolly he saw how he had first welcomed this stimulus, for it helped him to overcome the limitations natural to him.¹³

This idea of enhancement is taken up elsewhere. Kira’s merging with a xenomorph into an enveloping body suit in Paolini’s *To Sleep in a Sea of Stars* is similar to Aldiss’ morel in the added power and protection that it gives her, enabling her to withstand the vacuum of space, to manipulate matter and to extend vicious barbed weapons. In comparison to the above examples, Kira is also able to develop more agency in controlling its defensive responses (which initially lead to carnage among a human exploratory team). She develops the ability to use the suit (the ‘softblade’) to manipulate and gather matter:

Kira took a moment to visualise, with as much detail and clarity as she could manage, what she wanted. More importantly, she tried to impress her intentions on the softblade as well as the consequences of failure.. then she released the softblade and willed it to act on its own.¹⁴

The transparent merging of the suit with Kira’s will seems to qualify it as a full cognitive extension, in the same way that real-world senses can be extended with new kinds of interface. We will revisit this idea later, but before that we will continue with some examples of more egalitarian associations.

Pure Gestalt

Theodore Sturgeon’s 1953 novel *More than Human* is something of a landmark in depictions of an extended, multi-body consciousness

¹³ Aldiss, *Hothouse*, 180.

¹⁴ Christopher Paolini, *To Sleep in a Sea of Stars* (Basingstoke, UK: Tor Books, 2020), chap. 3.

enabled by telepathy. Sturgeon's story was influenced by the work of the Gestalt psychologists in the 1920s and 1930s who proposed new models of visual perception based on holistic effects and patterns. A key approach of their work was that a percept could not be understood by breaking it down into individual parts, but needed to be treated as an emergent unity.¹⁵

More than Human takes the idea of the Gestalt and applies it to a group of children with different supernatural abilities. The novel describes how the telepathic power—almost a foreign implant, not yet connected to its host's mind—begins as a dormant entity inside Lone, one of the group. The power grows in its 'idiot' host, able to monitor its surroundings, but not yet picking up any clear signals or becoming active:

This was a thing that only received and recorded. It did this without words, without a code system of any kind. Without translation, without distortion and without operable outgoing conduits. It took what it took, and gave out nothing. All around it, to its special senses, was a murmur, a sending. It soaked itself in the murmur, absorbed it as it came—all of it. Perhaps it matched and classified, or perhaps it simply fed.¹⁶

The telepathic capability is awakened by a strong signal from a compatible human, a young girl and this causes it to connect more fully to its host's mind:

He moved toward the thing he sensed, and it was a matter of will, not external compulsion. Without analysis he was aware of the bursting within him of an insistent need. It had been a part of him all his life but there was no hope in him that he might express it, and bursting so, it flung a thread across his external gulf, linking his alive and independent core to the half-dead animal around it.¹⁷

As Lone finds the source of the signal and approaches her, the two minds connect for the first time: 'When it happened, that thread within him, bridging his two selves, trembled and swelled. Falteringly, it began

15 Irvin Rock and Stephen Palmer 'The Legacy of Gestalt Psychology', *Scientific American* 263, no. 6 (December 1990): 84–90. <https://doi.org/10.1038/scientificamerican1290-84>.

16 Theodore Sturgeon, *More Than Human* (New York: Farrar, Straus, & Young, 1953), 2.

17 *Ibid.*, 5.

to conduct. Fragments and flickerings of inner power shot across, were laden with awareness and information shot back.¹⁸

The girl is murdered by her abusive father, so there is no opportunity to continue this connection. But the experience stays with Lone, throughout his subsequent life and association with the small band of similarly gifted children. Later, they help him make sense of what happened. They put it down to the merging of an idiot and an innocent, both longing for an end to their condition: 'For a second, there was this other and himself and a flow between them without guards or screens or barriers, no language to stumble over, no ideas to misunderstand. Nothing at all, but a merging.'¹⁹

Lone's moment of clarity recalls the experience of contact of another telepath, David Selig, narrated in *Dying Inside* by Robert Silverberg. Selig is portrayed as one of few people with the special gift, though his powers are on the wane as he grows older. But he is still able to make an unusually deep connection on occasion, here with a new young woman desk clerk at his local book shop:

I burrow in easily, deep, down through layer after layer of trivia, mining her without hindrance, getting right to the real stuff. Oh! What a sudden blazing communion, soul to soul! She glows. She streams fire. She comes to me with a vividness and a completeness that stun me.²⁰

Selig experiences perhaps even deeper intimacy with another telepath he meets, Nyquist, first by merely detecting his presence in his apartment building:

The mental contact was stunningly intimate. It was almost a sexual thing, as though he were slicing into a body, not a mind, and he was abashed by the resonant masculinity of the soul he had entered; he felt that there was something not quite permissible about such closeness with another man.²¹

Although these particular moments of contact and merging are fleeting, they may also serve to underpin something stronger and more permanent. In *More than Human*, a recurring theme is the emergence of

18 Ibid, 9.

19 Ibid., 54

20 Robert Silverberg, *Dying Inside* (London: Sidgwick and Jackson, 1974), chap. 24.

21 Ibid., chap. 16.

the Gestalt, or larger intelligence, from a group with individual strengths and specialities—described as being the head, brain, arms and voice. In the book, the character of Lone struggles to find a definition or scientific precursor of this thing he has been part of, a group who can ‘blesh’ at will (blend and mesh).

The Gestalt movement proposed a number of perceptual principles based on their holistic approach, which are still hugely influential in psychology and neuroscience today, though their proposals for the specific underlying neural mechanisms have not fared quite so well. That said, their general idea of a stable equilibrium state in the brain when experiencing a gestalt has a lot in common with some of the current theories for the phenomenon of consciousness. Sturgeon’s emphasis on heterogeneity and diversity in his multi-brained Gestalt grouping also resonates with theories of distributed cognition and even high performing teams in the workplace.

The human hive

In the tradition of Sturgeon, the theme of telepathy and merging of human minds has been taken up by other authors, at different scales, depths and durations. In Stephen Baxter’s *Coalescent*, an ancient religious order in Italy develops an emergent hive-mind, seen by enthusiasts as a step change in human evolution:

‘We aren’t meant to be alone... We’re social creatures. Our minds evolved in the first place so we could figure out what is going on inside *other* people’s heads—so we could get to know them, help them, even manipulate them. Did you know that? We need people to make us fully conscious.’²²

Baxter explores the concept of ‘eusociality’, a biological term used to describe truly social communal species. The loss of individual will, in order to serve the larger colony, is contrasted with the norm of more selfish individualism.²³ For enthusiasts, it will be a way to hugely enhance human power:

22 Steven Baxter, *Coalescent* (London: Gollancz, 2003), chap. 25.

23 Fronhofer, Emanuel A., Jürgen Liebig, Oliver Mitesser, and Hans Joachim Poethke, ‘Eusociality Outcompetes Egalitarian and Solitary Strategies When Resources Are

When the break-out comes it will be a phase transition—all at once the world will transform, as water turns to ice... in its way it will be beautiful. But it's an end point for us. There will be new gods on Earth. From now on the story of the planet will not be of humanity, but of the hive.²⁴

While individualism has been sometimes blamed for many of society's ills, collectivism is also often carries the negative connotations of brainwashing, mindless conformity or bias. Certainly, human cultural differences which may be linked to the tendency toward collectivism show that it can also be linked to dialectic reasoning and 'wiser' social behaviour which enables conflict avoidance.²⁵ The question posed by *Coalescent* is whether we would be prepared to forgo individual freedoms to be part of something greater. The answer in the story is: perhaps not.

In his 1969 novel *The Several Minds*, Dan Morgan describes a group of telepaths (the 'psi-enabled') experimenting with the exploration of each others' minds. His idea of mind levels is strongly inspired by Jungian psychology, with more rational surface levels that are accessible and a deep unconscious level from which the Psi-enabled explorers need to be kept shielded, though this limits their understanding, as we see where an explorer enters the mind of a subject (Annette):

The only way to understand this maelstrom of mind was to disperse the membrane and allow himself to become part of what was going on around him. By doing so he would be exposing himself naked to the fiery hell of Annette's third level, inviting a madness that could result in the complete annihilation of his own personality.²⁶

Probing too deeply, he is lost and injured in his host's third level, until rescued by a colleague who helps him back to himself.

In *The Several Minds*, Psi power is described as being present in many people, who are unaware of the power but use it for unconscious persuasion. The small number of people with the usable power can learn

Limited and Reproduction is Costly', *Ecology and Evolution* 8, no. 24 (2018): 12953–2964. <https://doi.org/10.1002/ece3.4737>.

24 Baxter, *Coalescent*, chap. 48.

25 Hiroshi Yama and Norhayati Zakaria 'Explanations for Cultural Differences in Thinking: Easterners' Dialectical Thinking and Westerners' Linear Thinking', *Journal of Cognitive Psychology*, 31, no. 4 (19 May 2019): 487–506. <https://doi.org/10.1080/20445911.2019.1626862>.

26 Dan Morgan, *The Several Minds* (London: Corgi Books, 1969), 32.

to harness it but also to develop a 'Psi screen', which prevent others from connecting against their will. When voluntarily connecting, the link may be one to one or combined, as in this passage:

The Psi 'voice' was multiple, the product of a network of familiar minds... radiating a simultaneous message of sympathy and understanding whose sincerity he could not doubt.... The complete one-ness of the Psi-group, the maintaining of individuality and yet at the same time the intimate involvement of one unit with another, was brought home to him with a force never before experienced.²⁷

While telepathy remains a fictional construct, the current state of technology certainly indicates that direct brain-to-brain interfaces (BBIs) are on the horizon. Using an EEG-based brain-computer interface connected via the internet to a computer-brain interface has been shown to work, with simple motor image signals being sent by the sender and consciously perceived as light flashes by the receiver after being converted to magnetic stimulation.²⁸ While clearly in its infancy—and usually based on a one-way communication model—the interface technology is currently rapidly improving.

The fact that brain-to-brain connection is increasingly feasible and likely to be commercialised and made available in DIY kits means that threats such as hacking and coercion are going to be as serious as they currently are with purely digital systems. Certainly, better checks and balances are going to be needed, such as how individuals can control their level of vulnerability and receptiveness.²⁹

Some authors thought these issues of mental security through well before such technology was feasible in the real world. E.E. 'Doc' Smith's 1965 *The Galaxy Primes* is similar to Morgan's vision of superhuman telepaths, with the Primes described as advanced mind communicators possessing the 'Gunther Drive' who are selected for galactic exploration.

27 Ibid., 98.

28 Carles Grau, Romuald Ginhoux, Alejandro Riera, Thanh Lam Nguyen, Hubert Chauvat, Michel Berg, Julià L. Amengual, Alvaro Pascual-Leone, and Giulio Ruffini, 'Conscious Brain-to-Brain Communication in Humans Using Non-Invasive Technologies', *PLOS ONE* 9, no. 8 (19 August 2014): e105225. <https://doi.org/10.1371/journal.pone.0105225>.

29 Chang S Nam, Zachary Traylor, Mengyue Chen, Xiaoning Jiang, Wuwei Feng, and Pratik Yashvant Chhatbar, 'Direct Communication Between Brains: A Systematic PRISMA Review of Brain-To-Brain Interface', *Frontiers in Neurobotics* 15 (2021). <https://doi.org/10.3389/fnbot.2021.656943>.

Smith develops several protocols (rules) for thought communication, which are quite well developed. Similarly to *The Several Minds*, people in Smith's depiction have a graduated telepathy screen or 'lepping' that blocks unwanted penetration which can be probed for receptiveness status. To continue the radio-inspired themes, communication is 'tight beam' or one-to-one or 'open channel', more like a broadcast or a channel scan.³⁰

Garlock, one of the Primes, opens his telepathy filter while exploring a remote planet with an Earth-like civilisation, but no telepathy powers, who therefore unwittingly broadcast:

With his guard down to about the sixth level, highly receptive but not at all selective, he strolled up one street and down another. he was not attentive to detail yet, he was trying to get the broad aspects, the 'feel' of this hitherto unknown civilisation. He found himself practically saturated... the whole gale of thought was blowing over Garlock's receptors.³¹

Smith develops a tiered system of telepathy, where the Primes can override the screens of those less powerful than themselves. Even amongst the Primes themselves, there are variations in the extent of this penetrative power, leading to accusations of attempted manipulation at times. There are also oblique references to a Code they have signed up to, to use their powers for good.

Indeed, an overall vision of the story is that open minds mean progress and an escape from selfish and corruption:

'Stop it, Clee!' Lola jumped up, her eyes flashing. Garlock dropped the tuned group, but Belle took it over. Everyone there understood every thought. 'Don't you *see*, you've done enough? That now you're going too far? That these twenty-odd men, having had their minds opened and having been given insight into what is possible, will go forward instead of backward? Our world did it with no better. Millions and millions of other worlds did it. Why can't this one do it? Of course it can.'³²

There are few reasons to believe that this rather optimistic progressive effect would occur in practice if minds were directly linked. If our current experience with social media is anything to go by, increased access

30 EE 'Doc' Smith, *The Galaxy Primes* (St. Albans, UK: Panther Books, 1975).

31 Smith, *Primes*, 37.

32 Ibid.

to others has as many negative as positive outcomes. There may also be similarities with social media if BBIs are developed and marketed by a small number of commercial players. We could have a similar domination of the market by powerful companies like the Primes, each having their own proprietorial—and perhaps mutually incompatible—technology and protocols.

These doubts notwithstanding, there may also be some hope provided by the study of empathy, which is perhaps the closest mental ability to mind reading we have in our mental toolkit today. A range of small experiments and interventions, together with historical analysis, indicate that feeling and understanding of others can be improved through learning and practice.³³ This can lead us to build bridges to out-groups about whom we might otherwise make faulty assumptions and to build open-mindedness and sociality more generally. Some think that this process is already happening and leading the gradual but inexorable improvement of society, even if it doesn't always feel like it.³⁴

Perhaps selfless conscience has the power to do this. In *More Than Human*, Sturgeon's *homo gestalt*³⁵ is completed when the character Hip is given the opportunity to join the blessed group as a new functional part: "What part?", he demanded. "The prissy one who can't forget the rules, the one with the insight called ethics, who can change it to the habit called morals. The still small voice."³⁶

Gerry, whose unlimited manipulative power as the head of the Gestalt has led him into evil and unspeakable deeds, is reformed by Hip's forgiveness and a recognition that Gerry can let go of his inner resentment toward the world:

Their memories, their projections and computations flooded into Gerry, until at last he knew their nature and their function. And he knew why the ethos he had learned was too small a concept. For here at last was power which could not corrupt... here was why, and how, humanity existed.³⁷

33 Erika Weisz, Desmond C. Ong, Ryan W. Carlson, and Jamil Zaki, 'Building Empathy through Motivation-Based Interventions', *Emotion*, 19 November 2020. <https://doi.org/10.1037/emo0000929>.

34 Roman Krznaric, *Empathy: A Handbook for Revolution* (London: Rider Books, 2014).

35 A new species created from the union of separate individuals with complementary powers.

36 Sturgeon, *Human*, 175.

37 *Ibid.*, 177.

So far these stories of telepathy and melding have been 'natural', occurring in humans with additional evolved or mutated mental capabilities. But there is also the possibility of a technical interface that might enable Sturgeon's vision of emergence and enhanced hive cognition. In Ramez Naam's *Nexus*, the eponymous revolutionary neuroactive drug consists of nanostructures that distribute themselves around the user's brain and create an interface which enables human to human connection. Developed by the military, the drug's programmable interface is extended by the story's main character Kade, a brain-computer interface specialist. He later introduces the experience of multiple mind connection to his new girlfriend/test subject:

Something happened. Eleven more minds grew larger in her perception. They brightened, swam more fully into focus. They were so full. So alive with thoughts and memories, emotions and desires. Her breathing synchronised with theirs. She closed her eyes and she could see and feel their individual lines of thought. Eleven minds touched her at once in eleven parts of her psyche.³⁸

This new technology requires adaptation and mind training, with those already skilled at taming and directing thought at a distinct advantage. The protagonist Kade experiences a mental connection to a group of monks who, through meditation, are able to go further than the meeting of individual minds and merge into one:

Monks filed in. He felt them. Heard them. They sat as they entered, cross-legged... The connection between their minds firmed. The greater mind began to coalesce. Kade could feel them all. He was aware of tiny ripples of thought that passed through their minds. Every tiny thought, every word, every snippet of song, every momentary fancy... Together their collective consciousness observed itself... It was hypnotic, serene, crystal clear and coherent.³⁹

Naam's vision feels like the most plausible of these human hive scenarios in not requiring the evolution of dramatically powerful telepathic and other powers. But other stories are similar to Naam's in that the telepathic potential comes with a need for training and practice and that

³⁸ Ramez Naam, *Nexus* (Nottingham, UK: Angry Robot, 2013), chap. 3.

³⁹ *Ibid.*, chap. 43.

people vary in their ability to exploit it. This too seems to add a little realism to what are sometimes otherwise far-fetched possible worlds.

Richard Powers' *Bewilderment* is another novel where human capabilities are boosted by a neural intervention. But in Powers' story, this is achieved through a novel neural training method where the subject learns to mirror the pathways of a different 'scanned' subject; in the autistic character Robbie's case, the scans originate from his mother. This training leads to personality change as Robbie becomes calmer and takes on some characteristics of his mother and others:

His nose and mouth twitch a little. His excited hands twist with explanation. You know how when you sing a good song with people you like? And people are singing all different notes, but they sound good together?⁴⁰

Robbie's transformation leads to international press coverage, which eventually leads to the procedure being banned for 'safeguarding concerns' (though more likely as he becomes an inconveniently vocal advocate for nature conservation and a perceived threat to the establishment).

Whereas collective minds are often seen as uniform or egalitarian in nature, this is not always the case. In William Gibson's *The Peripheral*, Flynn's brother and other characters are ex-members of a military unit called Haptic Recon, with embedded tattoos to link them to a drone network and to wire commands directly into their nervous systems.⁴¹ More morbidly yet, in the short story 'Dreadnought', Justina Robson portrays an army of dead soldiers, kept alive and networked by technology and directed by a living host, whose consciousness is needed to assert command:

This is Armor itself! The all-of-us-at-once, every unit, every man and woman, every fused level of our single army. O Captain, my Captain, my commander, my body, my soldiers, my plan, my one, my true! He/we are uncertain. We are afraid. There is nothing to hold on to.⁴²

40 Richard Powers, *Bewilderment* (New York: W.W. Norton, 2021), 70.

41 William Gibson, *The Peripheral* (London: Viking, 2014).

42 Justina Robson, 'Dreadnought', *Nature* 434 (March 2005): 680. <https://rdcu.be/dbhSt>.

Such visions are of dependency and military hierarchy, with lasting or fatal consequences for the individual members. Rather than an equitable and mutually empathic assemblage of minds, they remind us again that coercion and control is another possible outcome of direct thought communication.

The alien hive

Often tales of a human hive see the grouping as a transient phenomenon, with only short lived emergence and enhanced cognition; this is less of a restriction when the constituents are alien. Hoyle's *The Black Cloud* is one such depiction of swarm intelligence, this time within an alien dust cloud that arrives and settles in the solar system, threatening life on earth. The cloud is eventually identified as possessing intelligence by the scientists studying it:

Let me describe how I see biological evolution taking place within the Cloud. At an early stage I think there would be a whole lot of more or less separate disconnected individuals. Then communication would develop, not by a deliberate inorganic building of a means of radiative transmission, but through a slow biological development. The individuals would develop a means of radiative transmission as a biological organ... Communication would improve to a degree we can scarcely contemplate. A thought would no sooner be thought than communicated. An emotion would no sooner be experienced than it would be shared. With this would come a submergence of the individual an evolution into a coherent whole.⁴³

Communication is established when the scientists broadcast details of human science and language. The cloud expresses surprise that intelligent life could arise on a planet with strong gravity and limited energy supplies. It also finds it peculiar that communication symbols only approximate underlying mental states.

The Black Cloud's constituent elements are never very clearly described, but other novels paint individuals within a hive in more detail. In *Star Maker* by Olaf Stapledon, 'multi-alien' collective minds feature across a range of levels and scales. At first, the narrator's tour of

⁴³ Fred Hoyle, *The Black Cloud* (London: Heinemann, 1958), 'Close Reasoning'.

the universe incorporates planets where a hive mind is the main form of advanced intelligence. In one instance, the collective consciousness is found in flocks of small avian creatures:

Each brain reverberated with the ethereal rhythms of its environment; and each contributed its own peculiar theme to the complex pattern of the whole. So long as the flock was within a volume of about a cubic mile, the individuals were mentally unified, each serving as a specialized center in the common 'brain'. But if some were separated from the flock... they lost mental contact and became separate minds of very low order.⁴⁴

In Stapledon's imagined worlds, the hive pattern in aliens is as likely to occur as it is among species on Earth.

Authors don't always elaborate on the exact mechanism for extra-bodily communication between individuals who are part of a collective. The alien Aleutians in Gwyneth Jones' *White Queen* at first appear to be capable of telepathy with humans, but as the novel progresses, some doubt is introduced as to whether this power is truly psychic or more a kind of highly empathic nonverbal sleight of hand: 'It did not speak. Do any of us really speak in casual conversation? Approximation fills the spaces: Each fills the other's part. But how could an *alien* play that game?'⁴⁵

Between themselves, the Aleutians can communicate over distance. While this generally implicit and unconscious, this momentarily becomes conscious in Clavel, the Aleutian in love with the human character Johnny:

Around Clavel, the voices: whispering, shouting, grumbling, humming in quiet contentment; panting hard and fast in the greedy scuffle of lying down together. He walked in a cloud of witnesses, a slurry of other presences thick enough to chew. Always there. There had never been need or reason to describe the way they were there. But he could feel them tonight the way they would seem to a—to *Johnny*. He was haunted.⁴⁶

Clavel's heightened awareness of his own culture seems triggered by his recent disastrous sexual encounter with Johnny, reaffirming his

44 Olaf Stapledon, *Star Maker* (London: Penguin Books, 1937), chap. 7.2.

45 Gwyneth Jones, *White Queen* (New York: Orb Books, 1994), 105.

46 *Ibid.*, 216.

out-group membership and leading to the reconsideration of xir own identity typical of reverse culture shock.

Not all descriptions of hive mind require large scale assemblages. In Vernor Vinge's *A Fire Upon the Deep*, the alien hive minds are small in size but highly connected and interdependent. The Tine are dog-like creatures that form packs with one shared mind. Individuals can join packs, but a pack reduced in members loses much of its power. Early in the novel a pack loses one of its members in battle:

Rum sighed, and could not see the sky anymore. Wickrackrum's mind went, not as it does in the heat of battle when the sound of thought is lost, not as it does in the companionable murmur of sleep. There was suddenly no fourth presence, just the three, trying to make a person. The trio stood and patted nervously at itself.⁴⁷

Sharing much of the same genotype, the packs nevertheless vary in age and personality, the varied age structure allowing continuous renewal. The packs need to stay in close proximity or become greatly enfeebled. But as this relatively 'medieval' (in human terms) alien race discovers radio technology, they quickly make the connection whereby they can use it to spread themselves over larger areas. The first tester's experience is one of omniscience:

She was seeing as if in a dream. Her eyes were so far apart. Her pack was almost as wide as the castle itself. The parallax view made Hidden Island seem just a few paces away. Newcastle was like a model spread out around her. Almighty Pack of Packs—this was God's view.⁴⁸

The heterogeneous hive

What if humans and aliens could combine their consciousness with those of alien minds which have developed independently across the universe? A young pack in Vinge's story becomes inseparable from Jefri, a human castaway. Together they show enhanced intelligence, and by the end of the novel, the Queen 'Woodcarver' is planning to co-educate young Tines with other human children. The superior emergent

⁴⁷ Vernor Vinge, *A Fire Upon the Deep* (London: Millennium, 1992), chap. 4.

⁴⁸ *Ibid.*, chap. 30.

properties of the alien-human partnership echo those of Sturgeon's Gestalt.:

Watching Jefri and Amdi, Ravna was beginning to see what might become of this. Those two were closer than any children she had ever known, and in sum more competent. And that was not just the puppies' math genius; they were competent in other ways. Humans and Packs fit, and old Woodcarver was clever enough to take advantage of it.⁴⁹

This vision can be yet more ambitious in scale and in the objective to connect diverse and galactically distributed races.⁵⁰ In Stapledon's *Star Maker*, the narrators' travelling human consciousness gradually melds with those of other races, though starting with those whose minds most closely resemble ours:

Our penetration of one another's minds brought not merely addition but multiplication of mental riches; for each knew inwardly not only himself and the other but also the contrapuntal harmony of each in relation to the other. Indeed, in some sense which I cannot precisely describe, our union of minds brought into being a third mind, as yet intermittent, but more subtly conscious than either of us in the normal state.⁵¹

As more contact is made with other races, planets and galaxies, in the story, long range telepathy also develops, and with the sensory enhancement of long range sensors and other instruments, the scale of the emerging mind becomes cosmic:

And now at last the many kinds of spirit which composed the galactic society were bound so closely in mutual insight that there had emerged out of their harmonious diversity a true galactic mind, whose mental reach surpassed that of the stars and the worlds as far as these surpassed their own individuals.⁵²

This vision of emergent cosmic consciousness is Stapledon's logical extrapolation from small incidents of connection. It also has much in common with some religious philosophies—but is a rejection of a

49 Ibid., epilog.

50 A good example is Ursula Le Guin's *The Left Hand of Darkness*, where mindspeech is shared by members of the Ekumen, a confederation of worlds, with new worlds being gently inducted into the ability. Ursula Le Guin, *The Left Hand of Darkness* (New York: Time Warner International, 1987).

51 Stapledon, *Star Maker*, chap. 4.

52 Ibid., chap. 11.4.

monotheist, hierarchical doctrine. The Star Maker ‘himself’ (with a small h) is depicted experimenting by creating races in thrall to a powerful God who fail to reach their social and technological potential. Stapledon’s final feeling toward the creator is that of a being creating a cosmos where social connection and the emergence of unified, outward-facing spirit is possible.

Conclusion: diversity, deliberate practice and connection

The idea of minds connecting and meshing has captured the imagination of many authors, the models and mechanisms we see in the animal world providing living inspiration. And often the vision has been a hopeful one: humans progressing to a new, more enlightened age, or humans merging with alien races to form a universal connected mind. But stories of possession or subjugation to the hive provide a useful counterpoint to such optimism. While such situations may lead to progression in some senses, it may be at the unacceptable cost of loss of our prized independent will and agency.

Everywhere we see echoes of Sturgeon’s vision of the Gestalt. The recognition that a diversity of individuals with individual strengths form a stronger whole is powerful and links well to a wealth of scientific and pragmatic ideas ranging from distributed cognition to the formation of workplace teams. Still, as Sturgeon warns us, even an ideal seeming gestalt may not be immune to tyranny from the head.

The fictional Gestalt itself is really a natural extension of our biological state, where our own evolution shows the merger of previously independent organisms to provide mutually beneficial functions and to enable further growth and sophistication. Authors have appreciated this fact and projected it, in Stapledon’s case, onto a galactic-scale canvas. What we can perhaps learn from these visions is that a simple appreciation of this interdependence and beneficial synergy is already possible, already here.

And full connectivity may be unpalatable. Depictions of the clamour of other minds are common in accounts of mental connection. Perhaps this is where our separation might be more valued. Silverberg’s

telepath Selig in *Dying Inside* eventually loses all his powers, and while experienced as a loss, there is also a new tranquility to the change:

The world is white inside and gray within. I accept that. I think life will be more peaceful. Silence will become my mother tongue. There will be discoveries and revelations, but no upheavals. Perhaps some color will come back into the world for me, later on.⁵³

As brain to brain interfaces become more sophisticated, we will face the same kind of questions that we currently have with social media around intrusion, privacy and bad actors alongside any positive impact. The keyword here is 'interface': stories that include controllable filters show how this can develop to be as consensual as regular conversation or like a phone that can be set to 'do not disturb'.

So perhaps a 'full band' telepathic mental ability by both evolved and technologically-enhanced capabilities is undesirable. Instead, interfaces and organisation might allow for what programmers call 'loose coupling', where a hive can be composed on an ad hoc basis via specific and standardised public protocols, but much of the inner workings are protected. And, as Jones reminds us, these forms of conscious connection already exist, but may not always be recognised for what they are.⁵⁴

Distributed cognition research teaches us that interactions between people and changes in the external world such as new kinds of symbolic representation can have as much impact on emergent consciousness as changes in the genome. Such changes become part of cumulative culture if they prove useful. This seems a more likely path to better sharing of minds.

53 Robert Silverberg, *Dying Inside* (London: Sidgwick and Jackson, 1974), chap. 26.

54 Jones, *White Queen*.