Changing Conceptions of Solar System Habitability in *Dan Dare* Between the 1950s and the 2010s

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Dan Dare: Pilot of the Future is an archetypal British adventure hero who debuted in his eponymous science fiction comic strip in 1950. His adventures through the Solar System and beyond were serialised in full-page spreads in the *Eagle* weekly comic until 1969. But, his popularity was such that the serial and characters have been reimagined in comic books in every decade since, on radio (Radio Luxembourg 1951-6; BBC Radio 4 1990), on television (2002), and in 2016-17 as a series of six, full-cast audio dramatizations produced by B7 Media in association with Big Finish Productions. Generations of British children, parents and policy makers have grown-up with *Dan Dare* as part of their cultural milieu.

The original 1950s incarnation of *Dan Dare* has been convincingly located, together with contemporary science fiction such as that of Arthur C. Clarke, as arising from the austere post-war conditions of the UK (James 1987). Despite this, *Dan Dare* demonstrates a profound optimism not only regarding Britain's future international but also social, political and technological development. This optimistic outlook was a deliberate choice on the part of original artist and writer Frank Hampson who noted, 'I wanted to give them something that made the future more hopeful in human terms' (Vince 2004).

Hampson intentionally embedded *Dan Dare* in the realities of cutting-edge scientific development and worked with the *Encyclopaedia Britannica*, alongside extensive models and technical drawings, for reference. Clarke, then at the start of his career, was employed to fact-check the early scripts, although the extent of his involvement is unclear. His brother, Fred, claimed that he received scripts to regularly check but quickly decided this was unnecessary due to their quality (Crompton 1985: 84). Clarke may have suggested, though, that Venus

was more likely to be inhabited than Mars based on current knowledge (Porter 2005). He certainly contributed at least one short story to the *Eagle* in its early years (Dunnett 2011: 241-3) as well as a seven-page article on space travel to *Dan Dare's Spacebook* (1953).

Alongside Clarke's writings, *Dan Dare* can also be examined in the context of the contemporary radio serial, *Journey into Space* (1953-8), which featured a similar vision of human space exploration. Writer Charles Chilton had also worked for *Eagle*, albeit on a Western rather than science fiction theme. His biography does not acknowledge any direct influence from *Dan Dare*, describing the science fiction setting as a commission rather than choice (Chilton 2011: 197), but it is not difficult to associate the interest in space fiction at this time with the popularity of the *Eagle* stories which started three years earlier.[1] At least the younger listeners, attracted by an interest in space exploration and science fiction, would likely to be familiar with *Dan Dare* and its loving illustrations of space technology. Chilton's approach to scientific accuracy in his writing is also strikingly similar to that of Hampson; his biography describes his purchase of reference materials and a telescope, membership of the British Astronomical Association, and consultations at the British Interplanetary Society with Clarke and Patrick Moore, amongst others, in search of correct detail (197-8). Indeed, Oliver Dunnett identifies such conversations as formative of a mid-twentieth century conception of a 'British Outer Space' which influenced Chilton, Clarke and Moore (Dunnett 2012), and likely others such as *Biggles* author W.E. Johns who, alongside Moore and Clarke, was also producing juvenile science fiction in the 1950s.

Crucially, the commitment to scientific and technological plausibility in the early *Dan Dare* stories has been upheld by those working on contemporary recreations of *Dan Dare*, including the creative team behind the recent audio dramas. As one of the writers, Patrick Chapman, comments: 'a lot has changed in the world of real-life space travel since 1950, and so the human tech in our series has moved on' (Smith 2016: 8). As such, changes within the

Dan Dare universe represent the adaptation of popular conceptions regarding space travel, scientific knowledge and technological innovation that span seven decades of cultural and scientific advancement. In this article, I consider how *Dan Dare* has articulated our changing understanding of Solar System habitability, with particular reference to the first three *Dan Dare* audio dramas and the 1950s comic strips on which they were based: 'Voyage to Venus' (1950-1), 'The Red Moon Mystery' (1951-2) and 'Marooned on Mercury' (1952-3).[2] Of special interest is the degree to which the adaptations have balanced the need for action with the original strip's pedagogical mission, and the extent to which that mediates the concerns of a changing demographic within their audience.

Venus

In the original comics, the surface climate of Venus is portrayed as comparable to that of Earth, with two temperate hemispheres separated by a central 'flame belt'. It hosts two indigenous, sentient, humanoid races: the reptilian Treens, human-like Therons, and also a transplanted population who originated on Earth. Their activities are concealed from Earth by a thick cloud layer. By 1950, the cloud layer of Venus was well-established as scientific fact. However surface conditions were still a matter of informed speculation. Astronomers hypothesised an arid, oxygen-poor, lifeless world, enshrouded by dust storms (Spencer-Jones 1947: 45-46). As early as 1932, Edgar Rice Burroughs wrote that 'the world's best astronomers have assured us that Venus must be unfitted to support human life, that where her surface is not unutterably hot, it is unutterably cold, even though she be oxygenless' (Burroughs 1972: 26). Nonetheless, popular astronomy books of the time stressed the planet's status as a 'twin' of the Earth, and speculated about possible plant life (Jeans 1934: 135). Children's science books were still discussing Venusian surface life into the early 1960s.

The existence of water oceans on Venus was an area of active debate in the scientific literature in the 1950s and 1960s (Menzel and Whipple 1955; Bottema et al 1965). The popular image of a water-world can be seen in science fiction of the mid-twentieth century, notably C.S. Lewis's *Perelandra* (1943) and Olaf Stapledon's *Last and First Men* (1930). Abundant water, atmospheric carbon dioxide and Venus's proximity to the Sun also conjured an image of a humid, fertile world, similar to carboniferous Earth which had an equally carbon dioxide-rich atmosphere. In W.E. Johns's *Kings of Space* (1954), Venus's impenetrable clouds conceal identifiable prehistoric species and marshy jungles of ferns, while Robert Heinlein's *Space Cadet* (1948) also notes that 'the turf was as damp and the day was hot and muggy as only Venus can be' (Heinlein 1971: 128). Such worlds are a clear influence on *Dan Dare*, and continued to appear into the next decade, although by the 1950s they were already losing scientific credence (Launius 2012).

The Mariner and Venera missions of the 1960s, together with more recent studies, made clear the highly acidic nature of the planet's atmosphere and its very high surface temperatures, eliminating the surface of Venus as a habitable environment (Taylor et al 2018). Later versions of *Dan Dare* were forced either to ignore this scientific fact, as in the case of the 2002 animated series, or address it. By the time of the 2016 audio dramatization, an averagely science-literate audience was no longer willing to accept an Earth-like Venusian ecosystem. Thus the Treens are now described as colonising Venus from elsewhere and, instead of living on the hostile surface, inhabit platforms suspended in the cloud layer; the surface and other Venusian races no longer feature. The potential habitability of high-altitude clouds on Venus was discussed as early as 1967 (Morowitz and Sagan 1967), and has appeared in recent science fiction such as Geoffrey A. Landis's 'Sultan of the Clouds' (2010). However, although an altitude of 50 km Venusian air temperature and pressure are

indeed comparable to those on Earth, the audio adaptation failed to report that clouds at these altitudes are primarily comprised of sulphuric acid.

Given the central role of Venus and its peoples in the Dan Dare universe, and the likely objections of aficionados who form a key part of the target audience, these substantial changes nonetheless represent a conscious decision to maintain scientific accuracy by the production team. With the still-debated discovery of phosphine, a potential chemical marker of biological activity or 'biosignature' in the Venusian cloud deck (Greaves et al 2020), the status of Venus as a habitable planet is once more the subject of intense scrutiny, and the audio updating of this key setting has never appeared more appropriate.

Mars

Mars is the planet in the Solar System most often associated with human habitability in popular culture. In the first half of the twentieth century, Mars was believed to be an old world (Spencer-Jones 1951: 164), due the so-called Nebula Hypothesis. This suggested that the outer solar system condensed from gas ejected from the contracting Sun, such that planets closer to the Sun were younger. While this is no longer an accepted theory, Mars is a smaller planet with a lower gravitational potential than Earth. As a result it condensed water on its surface, became tectonically inactive, and rapidly lost most of its atmosphere, suggesting the potential for past rather than current life.

This possibility drives representations of Mars as an ancient world with an advanced, extinct or near-extinct civilisation, which extends as far back as Kurd Lasswitz's *Two Planets* (1897) and H.G. Wells's *The War of the Worlds* (1898). This picture of a declining Mars appears in science fiction pulp literature of the 1930s, such as the stories of Leigh Brackett and C.L. Moore, alongside the more Earth-like environments in planetary romances. Visions of an ancient Mars can also be seen influencing Ray Bradbury's *The Martian Chronicles*

(1950), Chilton's *The Red Planet* (1954-5), Johns's *Kings of Space* and even the *Doctor Who* serial, 'The Ice Warriors' (1967).

By the 1950s, Mars's atmosphere was known to be extremely thin and attempted observations of biosignatures associated with chlorophyll had disfavoured extensive plant life (Jeans 1934: 140), although some seasonal variations in the brightness was still attributed to lichens, known to tolerate extreme environments on Earth (Payne-Gaposchkin 1956: 194-8). In *The Sands of Mars* (1951), Clarke proposed a stunted native flora deriving energy from chemical means rather than photosynthesis, acknowledging the planet's aridity and negligible atmospheric oxygen. His colonists were forced to inhabit pressure domes, although with conditioning and a simple face mask they could survive on the surface. A similar scenario occurs in *Journey into Space* where humans could survive Mars only with their metabolisms altered by a hypnotic trance, and both *Journey into Space* and *Kings of Space* hypothesised vegetation along the hypothesized canals.

In common with these contemporary examples, *Dan Dare* showed Mars as a dead world in which an earlier biosphere of native life was extinct (aligning with the Old Mars trope), but which had been settled by humans from Earth. The population inhabited domed settlements and engaged in leisure activities that included skiing at the ice-bound Martian poles. They could venture outside in lightweight 'playsuits' rather than full space suits and enjoy low-gravity entertainment, acknowledging the real-world conditions. Indeed the masks worn by tourists in *Dan Dare* are similar to those described in *The Sands of Mars*. While a small amount of vegetation existed on Dare's Mars, this was described as a consequence of terraforming efforts.

Given the reasonable grasp of Martian conditions by the scientific community of the 1950s, the main changes in representations of the planet over the following decades regarded the manner in which humans might settle or use the planet. The fizzling out of the Apollo

lunar programme, accompanied by a decline in NASA's budget, rendered attempts to reach Mars impracticable and was accompanied by a rising level of public cynicism regarding human spaceflight (Launius 2003). This disillusionment manifested in science fiction conspiracy films such as Peter Hyams's *Capricorn One* (1978), which questioned whether reaching Mars was even possible. As robot missions confirmed the expense and difficulty of reaching Mars but also its potential, Kim Stanley Robinson's Mars Trilogy (1992-6) powerfully articulated the technical, political and human difficulties of settling Mars. At the same time, the rapid growth in the commercial space industry raised the prospect of non-governmental Mars missions (Pomeroy et al 2019).

The 2016 audio dramatization of 'The Red Moon Mystery' demonstrates minor improvements in scientific understanding. There is now no mention of vegetation or native Martian life, and characters wear full space suits, recognising the low temperatures and hostile radiation environment now known on Mars (Montmessin et al 2017). Again, this positions the audio dramas in line with contemporary science fiction, such as the harsh struggle for survival popularised by Andy Weir's *The Martian* (2011). In addition, the moon Deimos is described as a captured asteroid – a possibility currently discussed in the scientific literature (Hansen 2018).

However, larger changes reflect the shift in cultural and economic attitudes towards Mars. Human settlement is limited to a clandestine, modular, privately-owned research lab not because a larger settlement is technically impossible but because the civilian leisure complexes envisaged in the 1950s are economically impracticable. The role of the Eagle Corporation in the audio dramas fits the paradigm of space commercialisation; its motivation is described by the script editor Colin Brake: 'we tried to build in both contemporary knowledge of space exploration and the fact that space travel is increasingly being seen as something that is done by commercial operators rather than organisations like NASA and

ESA' (Stuart 2020). The earlier romance of the comic strip is thus overtaken by harsh economic realities that emphasise both the difficulties and the social restrictions to interplanetary exploration.

Mercury

The original *Dan Dare* story, 'Marooned on Mercury', involves the enslavement of a native Mercurian sentient species and their forced labour. The existence of life similar to our own on Mercury has always been considered unlikely, simply due to its proximity to the Sun. As a result, relatively little space fiction has featured this planet, with most stressing its hostile heat or potential for mining of heavy elements.

At the end of the nineteen century, Mercury was believed to be tidally-locked, always showing one face to the Sun (Maunder 1913: 114), and this belief influenced science fiction into the 1950s. Robert Silverberg's 'Sunrise on Mercury' (1957) captured the prevailing view: 'It was the cold, ice-bound kingdom of Dante's deepest pit – and it was also the brimstone empire of another conception. The two met, fire and frost, each hemisphere its own kind of hell' (Silverberg 1957: 24). Mining or other settlements in examples such as Isaac Asimov's *The Big Sun of Mercury* (1956) were therefore described as being on the terminator or polar regions, where conditions were most temperate. Where life is hypothesised in this period, it is very unlike that on Earth, as exemplified by Silverberg's sentient pool of molten zinc. Mercury is now known to have a slow axial rotation. In fact, its day exceeds its year with three rotations completed for every two orbits (Pettengill and Dyce 1965). This discovery quickly propagated into science fiction, such as Clarke's *Rendezvous with Rama* (1973), in which Mercury is a mining world although still described in infernal metaphors that acknowledge the hostile conditions: "To most people, Mercury was a fairly good approximation of Hell; at least it would do until something worse came along. But the

Hermians were proud of their bizarre planet, with its days longer than its years, its double sunrises and sunsets, its rivers of molten metal…" (105)

'Marooned on Mercury' demonstrates that knowledge of Mercury's presumed tidal locking had reached public awareness, with Dare's ship landing at the terminator. It accurately describes the low surface gravity of the planet and also its high surface temperature (shown to support lakes of molten lead). Crystal-like space suits are required by native Mercurians when on the surface for protection from heat and radiation. The 2016 incarnation of *Dan Dare* retains protective environment suits, but updates the discredited terminator setting to one close to a pole. As the adapter, Marc Platt, acknowledged:

> In the 1950s, it was assumed that the planet Mercury did not rotate; that like the Earth's moon, it had permanent dark and bright sides. Now we know that one burning day on the surface of Mercury lasts 88 Earth days, followed by a freezing night – so it's best to keep moving. Although we don't know yet that there is no fungal forest growing under its ravaged crust. (Platt 2016)

The 2016 audio dramatization also rationalises the existence of a very sparse ecosystem in pressurised caves through the growth of oxygen-emitting lichen (and oxygen-absorbing fungus). Atomic oxygen in the thin atmosphere of Mercury is believed to arise due to outgassing from the planet's crust, suggesting that oxygen-rich rocks indeed exist for any lichen to break down (Killen et al 2007). In the dark, unpressurised environment of Mercurian caverns, however, lichen would gain little advantage from the release of oxygen and it is unclear how any higher life could subsist. The Mercurians' requirement for an atmosphere not dissimilar to Earth's and pressurized environments in both comic and audio stories is thus best treated as a narrative requirement.

The updating of scientific information between the 1950s and 2010s versions of *Dan Dare* makes clear the importance placed on its accuracy (or at least plausibility). However,

further consideration is required to contextualise this emphasis and the consequent updates. For instance, *Dan Dare*'s role as a beacon of aspiration, Britishness and technological futurism has been widely discussed (see, for example, Chapman 2008; Hollingham 2017; James 1987). This was certainly a deliberate positioning; as Hampson himself noted: 'Very soon man is going to cross space and explore the planets around him as Columbus crossed the Atlantic to America – but at the end of the Spaceman's voyage will be twenty million Americas' (Hampson 1953: 3). *Eagle*'s part in recording the technological aspirations of the 1950s and `60s has also been recognised in exhibits such as *Dan Dare and the Birth of Hi-Tech Britain* (2008-9) at London's Science Museum, which holds Dare artwork and memorabilia in its permanent collection. There is much more that can be said on these topics and on the record of cultural, social and political history that can be traced in the different versions of *Dan Dare* and contemporary texts. Such an exploration lies beyond the scope of this work, but begs the question of how stories rooted in a 1950s vision of the future can be updated in a twenty-first century context without losing either their social commentary or technological basis. Focusing on the representations of scientific content, I will consider the positioning of *Dan Dare* with regard to two key considerations: *education* and *inspiration*.

Dan Dare as Education

Was Dan Dare ever intended to be educational? The character was introduced with the explicit intent of creating a wholesome and moral, yet also exciting, role-model (Chapman 2008). These ideals were reflected in high production standards for the comic strip and, crucially, in a focus on scientific plausibility in its storylines and the supporting material that appeared in the *Eagle*. To quote a national newspaper: 'everything in *Eagle* has to be pondered on carefully, such is the sophistication and know-how of the modern youngster. [...] These drawings are done by skilled technical artists, and they must be accurate down to the

last screw' (*The People* 1964: 16). Thus the *Eagle* of the 1950s and `60s featured cutaway diagrams and articles on technological innovations, celebrating the science which underlay the science fiction. In fact, *Dan Dare's Spacebook* dedicated no fewer than 23 of its 69 pages to real-world factual information, in addition to in-universe technical detail.

While accuracy was inevitably sacrificed in favour of narrative requirements, where possible, settings were shown according to the then-current best knowledge. Technological innovations were introduced with an explanation, and a supporting staff of scientists and engineers were consulted by the main characters. This occurs most prominently in 'The Red Moon Mystery' which involves not only spectral biosignatures but also vibration-based sonic weaponry, magnetic-dynamos, electron streams inducing lightning, stellar novae and gravitational physics – all rooted in solid scientific theory – and drawings taken from photographs of the Palomar and Herstmonceux observatories. Thus young readers, primarily boys, were introduced to genuine physics and their curiosity stimulated.

Hampson explicitly acknowledged this when questioned regarding his character Digby's role as an asker-of-questions: 'It did give us an excuse to fill in a few background details for the readers… In a way we were making Dare educational as well as entertaining' (Vince 2004). Given that contemporary British science fiction writers such as Clarke, Johns, Moore and Chilton were similarly rigorous in their use of contemporary science reference sources, *Dan Dare* is situated at the leading edge of a mid-twentieth century paradigm in science fiction in which the audience was assumed to be both interested in and informed about cutting-edge scientific knowledge.

On the other hand, such an educational positioning is not without issues. *Eagle* frequently showed cutaway technical diagrams of fictional space vessels in the same manner as those of genuine technical innovations, sowing the seeds of potential confusion. For example, the compilation *Eagle Annual: The Best of the 1960s Comic* (2009) reprints an

undated letter which reports a schoolmaster who, on asking for the names of the first men to orbit the Earth, was answered with 'Dan Dare and Digby, sir!' (Tatarsky 2009: 60). While the anecdote is told for comic effect, it highlights a valid point: if material is presented as educational, how are audiences to distinguish science fiction from fact?

This question is not unique to *Dan Dare*. The relationship between science fiction engagement and scientific literacy is now well established in empirical literature (Menadue and Jacups 2018). However, science fiction can also act as a counter-educational force, introducing plausible but incorrect information which leads to misconceptions (Barnett et al 2006; Nowotny 2005). In recent years, there is evidence that some science fiction paratexts have even become actively *anti*-scientific, for instance *Doctor Who* tie-in media in which current scientific understanding of Earth's Moon is ridiculed (Sezen 2021; Stanway 2021).

By contrast, the *Dan Dare* of the 2010s has been written for a primarily adult audience accustomed to a much higher level of everyday technology than their 1950s juvenile forebears. Scriptwriter Richard Kurti notes that 'you accept what the modern audience is and what they're interested in' (Hollingham 2017); very few of those listening to the *Dan Dare* audio dramas on twenty-first century smartphones will, for instance, understand or be interested in the inner workings of their device. This contrasts to *Eagle* readers of 1955 who could construct a Dan Dare radio station with which to listen to their hero on Radio Luxembourg or *Journey into Space* on the BBC.[3] The learning objectives for today's population focuses more on the applications of technology rather than its creation; modern technology is expected to work out of the box.

Thus, the audio treatment of 'The Red Moon Mystery' omits all of the scientific details present in its source comic in favour of pheromone communications and an unexplained alien technology. This represents a shift away from technology education, and requires a lower degree of scientific literacy and intellectual engagement in the assumed

audience. Furthermore, the pacing requirements of the audio drama format do not permit the same volume of content as a long-running picture story. Technical detail is often dropped from the original plotline in favour of scenes focused on the commercial or political background, and the characters' personal or emotional development. The motivations for this change are perhaps articulated by Dare himself – in an original speech written by series script editor Coin Brake – in 'Prisoners of Space' (2017): 'You think a superior brain is all about intellect and planning, technology and strategy. But there's another intelligence: emotional intelligence.' The extent to which reductions in technical and scientific detail were a conscious decision in favour of dramatic content is inferred also by Professor Peabody's advice in 'Voyage to Venus' on avoiding technical information in public communication: 'keep the vlog vague… but enthusiastic'. Although the audio dramas are not devoid of scientific detail, it certainly features less heavily. If the motivation for including such material in the original comics was, at least in part, aimed at educating children, then its omission from the twenty-first century reimagining may acknowledge the more mature target audience, and a lower emphasis placed on educational content.

Dan Dare as Inspiration

One of the most enduring consequences of the depictions of our solar system in *Dan Dare* (accurate or otherwise) has been its role as inspiration for aspiring scientists and engineers. The Jodrell bank astronomers who professed their enthusiasm for Dare in the early 1960s (Tatarsky 2009: 60) were likely too old to have been directly influenced by *Eagle* comics, as were the commentators on Chilton's technical details in *Journey into Space*. However, *Dan Dare* has been cited (sometimes amongst other science fictions) as a direct influence in the career choices of its readers.

For instance, Professor Colin Pillinger rose to prominence in 2003 as the lead scientist for the ill-fated British-led Mars rover project Beagle 2 – which came closer to success than was appreciated in his lifetime (ESA 2015).[4] He spoke repeatedly of the childhood influences of both *Dan Dare* and *Journey into Space* (Derbyshire 2003; ESA 2003), and invited Charles Chilton to speak at press events to publicise the Beagle 2 mission (Chilton 2011: 209). Another planetary scientist, Professor John Zarnecki, who has helped develop probe missions to Venus and Mars, has also cited *Dan Dare* as an influence on his career choice in interview with the BBC's *The Sky at Night* (BBC4, 20 July 2019). Stephen Hawking reportedly cited *Dan Dare* as an inspiration (Tatarsky 2010: 181) while *Eagle* has also been acknowledged as a powerful influence by astronautic engineer Alan Bond, advocate of a renewed British space programme and of the *Project Daedalus* design study for the British Interplanetary Society (Hollingham 2017).

The impact of *Dan Dare* in inspiring scientists may also be indirect, transmitted through other science fiction media. Visual artist Mike Trim cited *Dan Dare* as a strong influence on his designs for *Thunderbirds* (1965-6), and many *Thunderbirds* comic strips in *TV21* were in fact drawn by artists who had previously worked on *Dare* (Taylor 2006). Furthermore, a number of creative individuals who shaped *Doctor Who* have also spoken of the inspiration of *Dan Dare*, for example, series producer Philip Hinchcliffe on the influence of the Mekon upon the design of Davros in one of the show's most memorable stories, 'Genesis of the Daleks' (1975). The fact that Peter Cushing's Doctor is seen on screen reading the *Eagle*, in the film *Doctor Who and the Daleks* (1965), not only links the two titles in the minds of older and younger viewers but also emphasises the cross-fertilisation between the two franchises.

Dan Dare, then, sits deep in the roots of popular British science fiction, and its role in inspiring young scientists has been both direct and indirect. However, it should also be noted

that in areas where the creators of *Dan Dare* might have intended to inspire, the strip's legacy has fallen short. A key example can be found in Professor Jocelyn Peabody. Introduced as an independent, multi-specialism scientist who overcame prejudice from Spacefleet superiors, she was phased out part-way through the series. Hampson was clearly proud of her creation (Vince 2004): "she wasn't just there to be rescued… In a way I struck a low for Women's Lib! She was shown as a very clear, attractive young lady." However there is no evidence that her presence in the series inspired either young women to pursue scientific careers, or young men to take issues of gender inequality in the sciences seriously. Indeed, the fact that Peabody continues to be held up as a role model for representation of female scientists emphasises just how little progress has been made in this respect (Tickle 2018).

If *Dan Dare* was originally intended to inspire, then again the lower emphasis placed on technical detail in the audio dramas may reflect its different audience. The recent reimagining of *Dan Dare* was pitched at an audience of adults who have already made career choices, and are unlikely to be enticed into science through dramas of this kind. Instead, they must live in a world defined by the scientific insights of others, and in which navigating the morality of scientific applications is more relevant than knowledge of their principles. Hence, we see a shift of focus in the audio adaptations from inspiring curiosity regarding technical careers to inspiring a questioning attitude to the morality and commercialisation of science, guided by Peabody's increasing ambivalence about her role with the Eagle Corporation.

Conclusion

Whether positioned as aspiration, education or inspiration, or some combination of these, the three *Dan Dare* stories considered here allow for direct comparison of how planetary habitability has been represented across seven decades of science fiction. As has been shown, the setting of each story has been updated to reflect improved scientific knowledge of

planetary environments, suggesting that elements of the original emphasis on accuracy have been retained and that a minimal degree of scientific plausibility is still seen as necessary for successful suspension of disbelief. The modifications are perhaps most striking in the case of Mercury, where a plausible (if unlikely) oxygen source has been hypothesised for the Mercurians.

While it is clear that an engaged audience in both the 1950s and 2010s was willing to overlook inconvenient factual knowledge where necessary, the change in emphasis from educational and inspirational material in the original comics to less detailed science content in the audio adaptations reflects a shift in audience demographic and interests. Such shifts raise questions as to how a writer can be faithful to both twenty-first century scientific understanding of the solar system and Hampson's original vision, which was based upon both what was then understood scientifically and the social realism of 1950s dreams of Britain's future. By updating science where possible, but focusing on character development, emotion and morality above technical detail, the writers of the audio dramas have adopted a stance which echoes the social commentary of Hampson's original, while invoking alien devices as a useful McGuffin to explain the technological divergence from 1950s expectations.

To date, the audio adaptation of *Dan Dare* has focused on reimagining the original stories in their original settings, that is, only those settings guessed at or known in the 1950s. Explorations of the habitability of newly-discovered environments may be seen in future *Dan Dare* stories, either in the current audio drama series or in other formats. Given the longevity of interest in the Dan Dare universe, such representations may well provide an equally valuable record of contemporary understanding of Solar System habitability, or indeed its social importance, in the decades to come.

Endnotes

[1] Chilton's Lemmy Barnett also has parallels with *Dare*'s Albert Digby. Both come from a working-class British background and serve as an 'everyman' for the audience, to whom factual and technical information must be explained. Chilton describes Barnett as based on himself but also notes that 'I was going to call him Alf, or Bert, or something like that' (Chilton 2011: 201), perhaps an unconscious echo of Digby's influence.

[2] Audio dramas were scripted by Richard Kurti and Bev Doyle, Kuiperames Swallow and Marc Platt respectively, and directed by Andrew Mark Sewell. The title 'Voyage to Venus' is used retroactively for the first, untitled comic strip.

[3] See, for example, https://collection.sciencemuseumgroup.org.uk/objects/co8407093/dan-dare-space-control-station-toy-toy-recreational-artefact (accessed 8 March 2021).

[4] 'Half a dozen dead Beagles' are mentioned in the audio adaptation of 'The Red Moon Mystery' in a nod to this project.

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