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**Review of 'Integrating Women into the Astronaut Corps:
Politics and Logistics at NASA, 1972-2004'
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REVIEW

From space cartoons, to TV series like *Star Trek*, to real life astronauts; space seemed to epitomise manhood and masculinity both in popular culture and real life. In fact, it was almost 23 years after the first American man was launched into orbit (1961) that the first American woman even got a look-in (1983). So what took so long?

This book gives an excellent history of the integration of women, technologically and socially, into the space program in America. It covers how NASA dealt with both the anatomical differences in sex and the cultural expectations of women (gender) in the workplace. The book also analyses how cultural ideals have influenced the expansion of American spaceflight to include women. Decisions about women's roles in the workplace are shaped by cultural expectation. In the early 1960's when the space programme was starting up, gender roles were still very strongly defined in American culture and the potential involvement of women raised questions such as whether it was 'proper' to have men and women working alongside each other, whether this would undermine a man's social responsibility to provide for his family and whether working outside the home might detract from a woman's caregiving duties or make her a lesser mother. The women who applied to become astronauts in 1960 and the six women who finally got selected in 1978 not only challenged this ideal but they also challenged a class ideal.

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**The Open
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Post-war middle class America viewed homemaking as a sign of prosperity and wives not working outside the home for wages were seen as a status symbol. America's first female astronauts struggled through scrutiny and criticism from the public and people within NASA. It was not long since society had considered it improper for a woman even to show her ankle, but the birth of the Shuttle era demanded sharing intimate spaces and personal lives.

Education

When NASA began recruiting for the space programme, women were disadvantaged from the start. While men had gained engineering, mechanical and aviation experience during the Second World War few women had similar levels of experience or the required qualifications. Even women who had put in hundreds of hours of flight time struggled to meet the strict NASA criteria. To even apply, applicants must be under-35 with 1500 hours of flight time and an engineering degree. NASA claimed they did not exclude women, but that there simply were not any women suitably qualified. This is not surprising at the time when women only held 7% of all science and engineering PhD's but were much more prevalent in psychology and other biological specialities.

Science media

In the 1960s, popular culture reinforced the view that the majority of American men (and many women) still expected women to stay at home and raise families. Popular TV series and cartoons regularly caricatured the barrier that the few women in technological careers strove to overcome. Even when set 100 years in the future, women were still portrayed in their traditional roles as caregivers, counsellors and cooks, albeit with different outfits. Stronger female characters always seemed to have their weaknesses, whether it was for sex (e.g. *Barbarella: Queen of the Galaxy* film¹) or an overemotional psyche, generously pacified by a male colleague. This did little to encourage or support the drive for scientifically motivated young women to apply for any positions within NASA.

Popular opinion

Meanwhile, the real life space race progressed as Russia launched their first woman into space in 1963. Valentina Tereshkova who started life as a textile factory worker and amateur parachutist became one of the first people to leave earth's orbit. Was America bothered that Russia had pipped them to the first-female-in-space crown? The answer is probably not. As NASA pushed to be the first to explore the moon, the issue of sexual equality in the barracks was not worth the time or the money for them. Public debates were voiced with a very small minority strongly pushing for equality, but the majority of Americans seemed indifferent to the whole topic. American women seemed to be expected to 'just-let-the-men-get-on-with-it', and indeed many thought women should be spared such hazardous duties. Most of the media at the time seemed to think the only reason to allow women in space was to "keep men company" as opposed to actually contributing something to the space race. "The spaceman is sure to retain his interest in having a female companion aboard even if liquor loses its appeal"². Doctors even recommended some "feminine companionship" to relieve stress. Social expectations of women influenced how women were perceived in relation to the technological and mechanical progression at the time i.e. as accessories to men's progression. As Foster rightly points out, since the war no one doubted much whether a woman *could* do it but more whether they *should* do it. When the Equal Employment Opportunity Act of 1972 came into force, surprisingly NASA had already started hiring female and ethnic minority applicants. So what changed their minds? NASA's decision to concentrate on a longer-term

scientific goal of incrementally moving humankind out into space rather than a short, crash course in beating the Russians certainly contributed, but it was no single event that helped make this a reality. Rather, it occurred gradually as a result of underlying social, political and economic changes in America as a whole.

Tricky Technology

Although it made sense to send women who were smaller, lighter and used less oxygen than men, difficulties in overcoming the social expectations and their different anatomy was pushing the boundaries of technology and NASA's budget. Foster eloquently discovers the details of making a space shuttle compatible with the female body. Problems with designing a space suit in the 1960's provided NASA with an easy scapegoat as to why women were not involved in the space mission and the price tag of \$100 000 to do it did nothing to help. However, NASA did acknowledge that it must stick to a stringent equality policy and they also hoped to attract positive attention to the agency. It wasn't until 1978 that NASA finally decided to design suits that fitted the smaller framed female and this is when the first six American female astronauts were selected for Group VIII. However, this was not an easy or cheap fix and this is probably why only 10 women have ever completed a space walk. Even in 2002, NASA had to stop work on a \$16 million project to develop a new space suit for smaller women. It wasn't just the space suit that proved costly and problematic but a much more intimate issue. How do astronauts use the bathroom? The 1970's heralded a number of experiments, which involved urinating in zero-g conditions in front of cameras so NASA's engineers could film how urine reacted in a microgravity environment. Having grown up during the strict modesty of the 1950s, many of NASA's engineers were blissfully ignorant of the female genitalia and designing intimate technologies for women came as a bit of a shock. They initially had the false impression that women secreted more mucus during their urination than men did and were concerned that this would clog up the sensitive plumbing! When asked by a younger female engineer "Didn't you have wives?" one engineer replied, "We didn't look!"

Breaking the mould

The impact that these first group of six women had on America in 1978 and how it viewed women's roles in society was massive. They broke gender barriers and provided role models and heroes for a whole new generation of future female astronauts. One of those selected, Anna Fischer, admitted that she started receiving fan mail from little girls all over America months before she had even started her training. The only female astronaut with children, Shannon Lucid, was asked endlessly how her children handled the idea that she would fly into space and she was asked to contribute to a book years before even leaving the ground. The media doted over the "Glamonauts" and referred to these women as "these six NASA lovelies".

Meanwhile the six women became idols in the eyes of the feminist causing their own personal identities to become sacrificed, and instead they became heroes. They tried desperately to become "one of the guys" whilst juggling a collective identity as the first female astronauts with their own individual personas. Trying to balance this mixture of social expectations still eludes some of today's front running female CEOs. Christine Lagarde who is head of the International Monetary Fund and one of the most powerful women in the world claims that "I think you cannot have [a successful career and family] at the same time... you must accept there will be failures"³. It is astonishing that even now if women can't quite manage to juggle being a primary caregiver with a successful career as well as being an attractive and physically desirable person, she is called a "failure".

The future of flying ladies

In the wake of climate change, there has been a call to reduce our carbon footprint and save the planet but some political leaders still consider that it might be easier to just relocate. In January 2004, George Bush called for a human mission to Mars and more recently President Barak Obama started work with commercial ventures to expand deep space capacity. This would call for humans to be exposed to space and its degenerating effects on the body for a longer time than ever known before. Not to mention the psychological implications that the endless loneliness and isolation in space may cause. The implications of this raises a lot of questions especially with regards to human sexuality and reproduction amongst the astronauts as a longer term in space increases the chances of a human pregnancy in space. There have been twenty-three women selected since 1978 for the Astronaut corps, nineteen of whom have spent more than 7000 hours in the laboratory of space. Their personal insights on the female body have laid the groundwork for future research. So far, the short-fired missions have allowed NASA to avoid the pressing "sex" question but as technology opens up new doors, the significant drought of information on menstruation, pregnancy and sex in space must soon be addressed.

Overall, Amy Foster gives an eloquent and succinct account of the integration of women into the Astronaut Corps as an example of an evolving account of women's history. By using this specific example where politics and technology created physical barriers to equality, she is able to highlight much larger issues about sex and gender still existing in our society. Society will never move forward until these barriers are overcome, allowing full integration of women in the workplace. I personally admire these astronaut women as pioneers of their time; not only educationally and physically gifted enough to become astronauts against social expectations, but also able to deal with the onslaught of direct media attention and publicity while maintaining a healthy family life.

ENDNOTES

¹ *Barbarella: Queen of the Galaxy* (1968) based on Jean-Claude Forest's French Barbarella comics

² "A Mrs in the Missile?" *Los Angeles Times*, 7 Sept. 1958, 12, History Archives, National Aeronautics and Space Administration, Washington D.C.

³ 'Women can't have it all' *The Telegraph*, 26th September 2012