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Opening extract from

One Small Step

Written by

Jerry Stone

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PUBLISHER'S NOTE

On receipt of this scrapbook, which is evidently the result of both hard work and keen enthusiasm, we were certain that it would fascinate and inspire the next generation of space explorers and scientists. With thanks to Mike, for permitting its publication.

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Project Apollo's main goal was to land Americans on the Moon and return them safely to Earth. This aim is depicted on the Project Apollo logo on the left.

ONE SMALL STEP

A Scrapbook

Have you ever looked up at the Moon and wondered what it would be like to walk on its surface? Most people have! Some ancient peoples believed the Moon was a bowl of fire, others thought it was a mirror reflecting the Earth. Some assumed that it got bigger and smaller as it went through its phases. Then, nearly 2,500 years ago, Greek philosopher Anaxagoras hit the nail on the head when he figured out that the Moon was a ball of rock reflecting the light of the Sun.

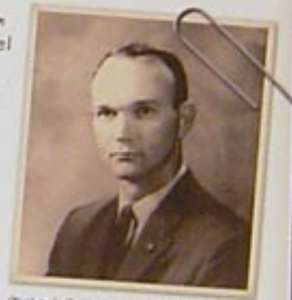
Gradually, over time, our understanding has grown and now, thanks to scientists at NASA (National Aeronautics and Space Administration), humankind have not only visited the Moon but keep going back, learning more and more each time.



This is a picture of me taken while I was working on this scrapbook. I'm 12 years old now, and one day I'm hoping to follow in the steps of the astronauts in this book... and beyond!

Hi!

My name's Mike. I'm named after Michael Collins, my mum's favourite astronaut and all-time hero. He was a pretty amazing guy, but you'll find out more about him later.



Michael Collins – Apollo 11 astronaut

She's a NASA scientist, my mum. What a cool job! Actually, it's more like a lifetime obsession. My grandpa was lucky enough to be working in the Mission Control Center at Houston on July 20th 1969 – the day of the Moon landing – and as she grew up, my mum caught the space bug!

She's working on developments to the International Space Station now, and tells me incredible things about our future in space. After all, if you think about it, only 40 years ago, nobody had set foot anywhere other than Earth, and now we're able to walk

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THE SPACE RACE

While Grandpa was showing me these incredible old photos that he had collected, he told me about a time called the International Geophysical Year. During this time, from 1957 to 1958, scientists made intense studies of our planet and its environment, with the idea of launching a satellite to orbit the Earth as a possible goal. The Soviet Union announced that they planned to achieve this, but few people in America took them seriously, believing the USA was technologically superior. When the Soviet Union successfully launched the Sputnik 1 satellite, Americans were stunned and demanded that they catch up. The Space Race had begun!

USSR

9 Mar 1934 - Yuri Gagarin born.

4 Oct 1957 - Sputnik 1 launched. The Space Race has begun and America is stunned!



Sputnik 1, the world's first artificial satellite. Sputnik was the Russian term for 'companion'.

3 Nov 1957 - Sputnik 2 is launched putting the first animal in orbit - Laika the dog.

2 Jan 1959 - Luna 1 is successfully launched to the Moon, but misses its target.

12 Sep 1959 - Luna 2 is launched and hits the Moon two days later.

7 Oct 1959 - Luna 3 takes the first photos of the far side of the Moon.

12 Apr 1961 - Yuri Gagarin becomes the first man in space in Vostok 1.



Yuri Gagarin just before his historic flight.

6 Aug 1961 - Gherman Titov spends a day in space in Vostok 2.

16 Jun 1963 - Valentina Tereshkova becomes the first woman in space in Vostok 6.



This is a Soviet postcard issued after the Cosmos launch to mark 'Pioneer of the Cosmic Era'.

How Did the Russians Do It?

Much of the success of space rockets came from research into missile development. To launch their heavy hydrogen bomb the [illegible] to develop a powerful rocket — the R-7. Not only was America's military rocket Redstone not as powerful as the R-7, but American President Eisenhower also wished the first US satellite to be launched using a non-military rocket.

Space!

[illegible] into space on flights but the Russian dog creature to orbit the Her name means [illegible] as a story on the

Now, here's a [illegible] forever stand history. This w cosmonaut Yuri G human [illegible] orbit the revol minutes Vostok









Russian scientists had heard that the US planned to conduct EVAs — that's extra-vehicular activities — during their Gemini space programme. In competition, the Soviets added an airlock to their Voskhod 2 spacecraft that allowed cosmonaut Alexei Leonov to leave the rocket and take the first spacewalk, which he did on 18th March 1965, walking in space for 12 minutes.



The R-7 rocket had a central core and 4 strap-on boosters, with a total of 32 engines, compared to the single engine of the Redstone.

US Satellite Launch

On 6th December 1957, the American Vanguard rocket rose just a few metres before crashing down on its launch pad and exploding — watched by the American public on live TV. Its cargo — known as the payload — was a satellite intended to study the conditions in Earth's orbit. Instead, the press compared it with the successful Sputnik and called it Flopnik and Stayputnik!



The Vanguard rocket explodes on the launch pad at Cape Canaveral.

Test flights with primates were launched before manned US missions. This picture shows Ham, the first chimp in space.

Project Mercury



Kennedy's Speech

Sooner or later, whenever Grandpa told his space stories, you knew he'd end up reciting the historic speech given by President [illegible]





Project Gemini

Project Mercury was followed by ten manned flights of the two-man rocket Gemini, named after the constellation known as 'the twins'. The goal of the project was to develop the techniques that were needed for the Apollo missions: long duration flights, EVAs and orbital manoeuvres, including rendezvous and docking with other spacecraft.

Gemini 7 in orbit, as seen by the astronauts of Gemini 6.

Project

Grandpa told me the t[illegible] three-man Apollo 1. H[illegible] all on its first mission but in January a fire [illegible] the spacecraft while [illegible] launch pad, killing the[illegible] inside. This led to a m[illegible] the first flight did not [illegible] another 18 m[illegible]

USA

16 Mar 1926 - Robert Goddard launches the world's first liquid-fuelled rocket.

20 Jan 1930 - Edwin 'Buzz' Aldrin born.

5 Aug 1930 - Neil Armstrong born.

31 Oct 1930 - Michael Collins born.

13 May 1946 - The Bumper 1 rocket (developed from the V2) launched in New Mexico reaches an altitude of 127 kilometres.

24 Jul 1950 - Bumper 8 is the first rocket launched at Cape Canaveral.

6 Dec 1957 - America's first satellite launch attempt, Vanguard, explodes on live TV.

31 Jan 1958 - Explorer 1 is launched. It becomes America's first satellite and discovers the Van Allen radiation belts.



The Explorer 1 satellite is launched into space by the Jupiter C rocket.

7 Oct 1958 - Project Mercury established.

9 Apr 1959 - The original seven Mercury astronauts were introduced to the press.

28 May 1959 - Two monkeys, Able and Baker, survive a suborbital flight into space.

31 Jan 1961 - A chimp named Ham makes a successful suborbital flight.

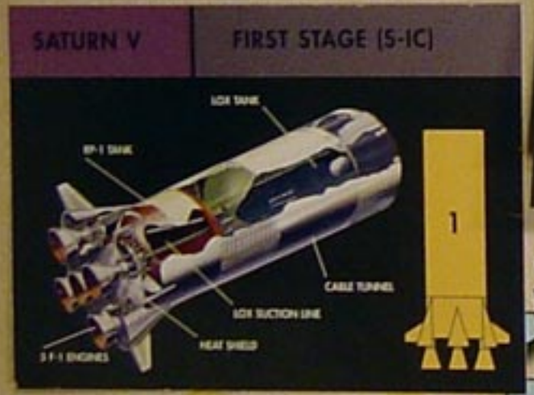


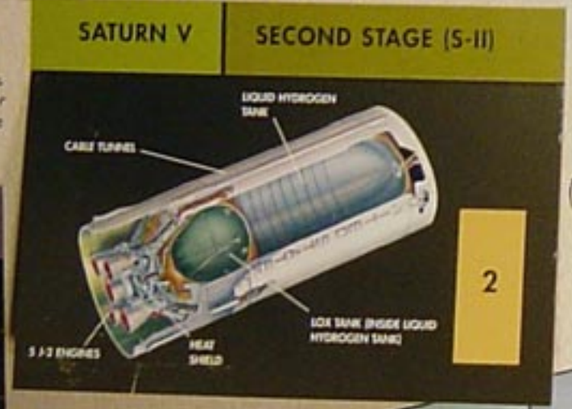
Ham's named stands for one half from Holloman Aerospace Medical Center.

APOLLO 11 AND SATURN V

You've got to be super-smart like my mum to become one of the astrophysicists who work at NASA – there's a whole universe of technical stuff to understand. After all, it is rocket science! Using photos of past NASA rockets, Mum has tried to explain the basics to me so that I can put these notes together. Where better to start than with the mighty Saturn V Moon rocket and the Apollo 11 spacecraft!

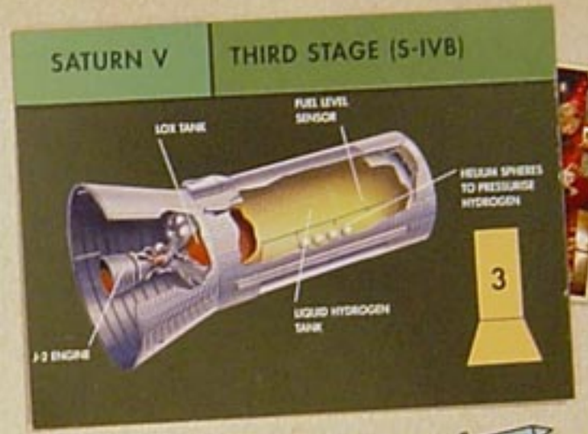
The Apollo 11 spacecraft was launched on Saturn V – the largest and most powerful rocket ever to send people into space. Its chief designer was Wernher von Braun and it consisted of three sections or stages, constructed in various locations across America. The stages were all brought together at the Kennedy Space Center (KSC), and stacked inside the Vehicle Assembly Building (VAB). The Apollo spacecraft was then added to the top of the rocket.





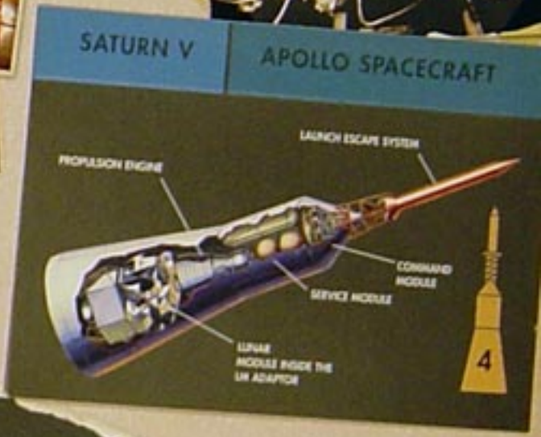


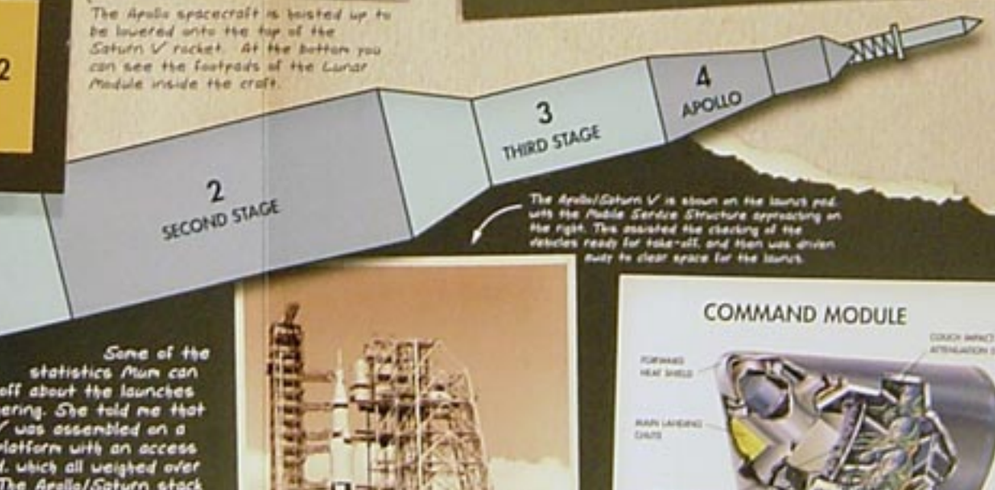
The Apollo spacecraft is hoisted up to be lowered onto the top of the Saturn V rocket. At the bottom you can see the footpads of the Lunar Module inside the craft.





In Grandpa's notebooks? I found this old photo of the Command Module simulator. Look how little room there was for the astronauts inside the spacecraft – eek!





The Apollo/Saturn V is shown on the launch pad with the Mobile Service Structure approaching on the right. This assisted the checking of the vehicles ready for take-off, and then was driven away to clear space for the launch.

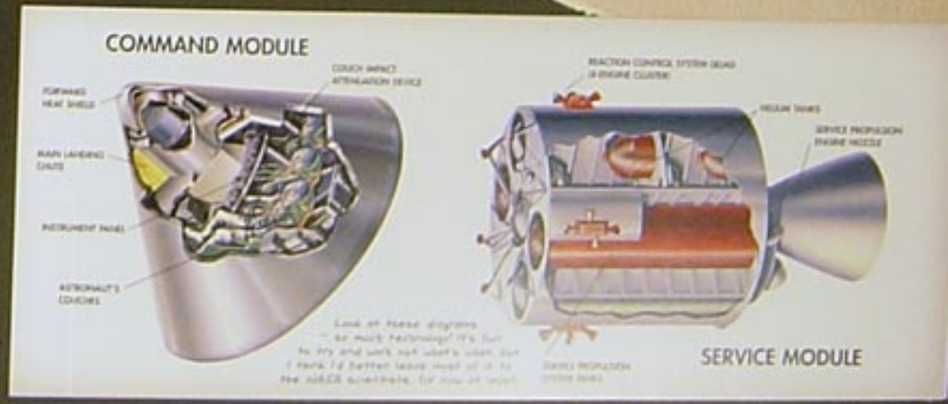
Here is the first stage of the Saturn V inside the VAB – one of the largest buildings in the world. The first stage engines burned RP-1, which stands for Rocket Propellant-1, or Refined Petroleum-1. This is a refined form of kerosene – a bit like jet fuel. Saturn V's five F-1 engines can produce 180,000,000 horsepower! That's as much as 85 Hoover Dams, or more power than all the cars in Britain put together!





Some of the statistics Mum can reel off about the launches are just staggering. She told me that the Saturn V was assembled on a mobile launch platform with an access tower attached, which all weighed over 9,500 tonnes! The Apollo/Saturn stack stood 111 metres high – as tall as the cross on the dome of St Paul's Cathedral and 18 metres higher than the Statue of Liberty on its pedestal! The 5.6 kilometre journey on the Crawler-Transporter to the launch pad took over seven hours!

The Apollo 11/Saturn V begins its roll-out from the VAB to Launch Complex 39-A, which is where it will take flight. The Crawler-Transporter operates using



Look at these diagrams – so much technology! It's fun to try and work out what's what, but I think I'd better leave most of it to the NASA scientists. Or now at least.