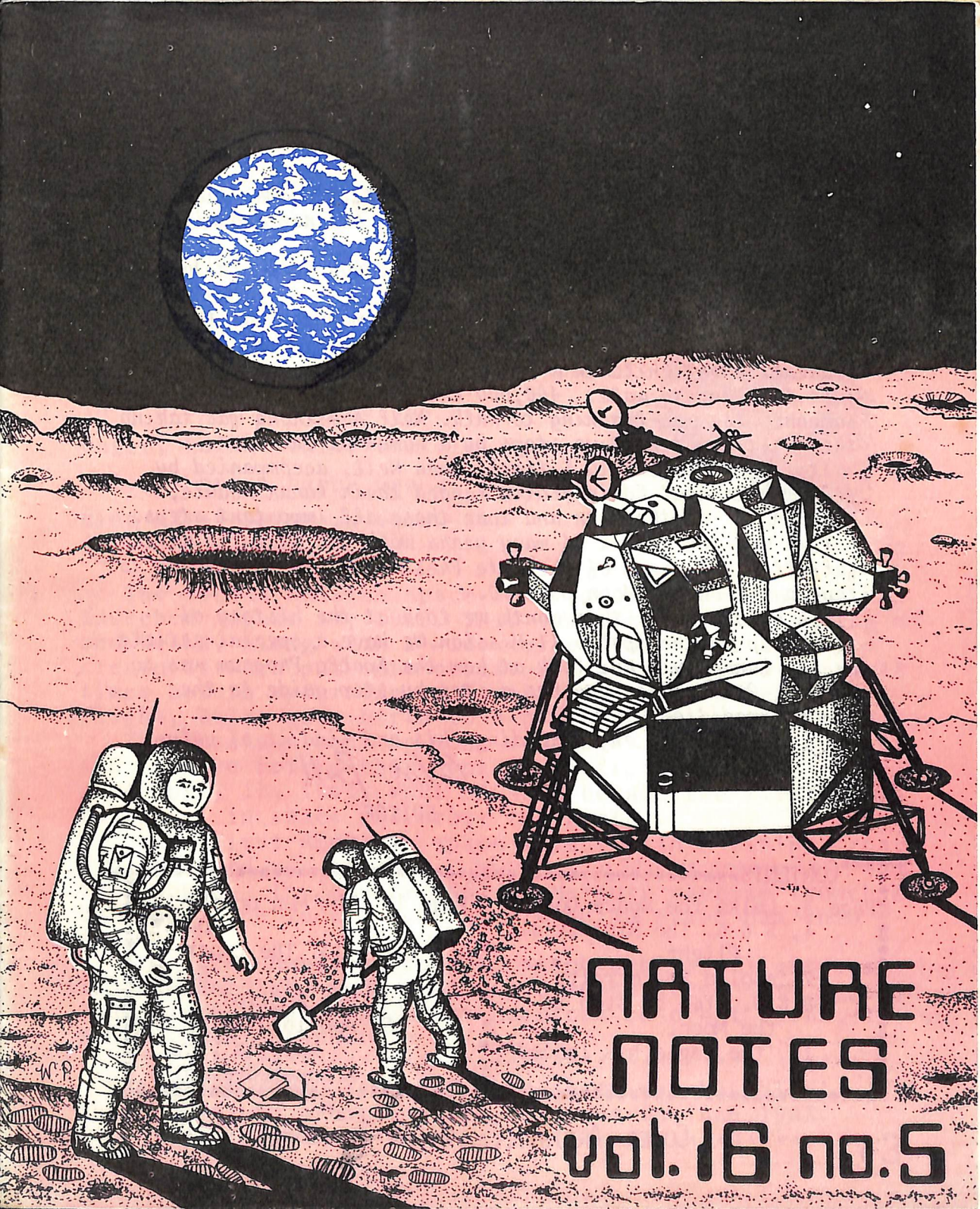


NATURE NOTES

vol. 16 no. 5

editorial;

HI,

This month we have ventured a little away from just nature and have gone into the realms of science and history to commemorate a very important event.

Think back just 10 years, -what were you doing in July 1969?

To many adults, they can probably remember what they were doing. I can remember watching television as I was still a student. Most children who are now in grades 5 and 6 were just learning to walk. 400,000 kilometres away from Earth, someone else was learning to walk. Neil Armstrong was taking the first few tentative steps by a human on the Moon.

It was on July 20 (U.S.time), when Neil, accompanied by fellow astronaut Edwin Aldrin landed their lunar module, "the Eagle" on the Moon and took those all important steps.

This was the climax of many years work and planning which fulfilled the dream of the late President John F. Kennedy to land a man on the Moon by 1970.

In Nature Notes this month we look at the history of flight up to the Apollo II Mission.We have a special article on the Lunar Suit and look at how the Apollo Program was so named. Our centre page has a step by step guide to the Lunar Expedition.

Ido hope you enjoy reading this and find it of value.

Colin Bull

EDITOR

CONTENTS

COVER ARTIST.....Wilma Prohasky.

Famous Animals, No 5

LAIKA- THE SPACE DOG.

The first living creature to be launched into space was Laika.

On November 3, 1957, only 3 weeks after the first Sputnik was launched, a second was put into orbit. On board was a passenger, Laika. Unfortunately, our tale is not a happy one as Laika died after being in space for one week.

The second Russian space-ship to carry passengers was launched August 19, 1960. This time, two dogs, Strelka and Belka, along with a wide variety of other living creatures were put into orbit. The ship orbited Earth 18 times before returning to Earth. Six weeks after the flight, Belka gave birth to a healthy litter of 6 puppies.

The Russians sent up many creatures with both success and failure before they sent up their first human cargo.

On April 12, 1961, YURI GAGARIN became the first human to travel in space and orbit the Earth.

The first American space flight with a living creature on board was in 1959. Miss Sam, a Rhesus monkey was 'shot' into space. In January 1961, a Mercury capsule launched by a Redstone rocket took a chimpanzee named Ham into space.

The first American to make a sub-orbital flight was Alan Shepherd who made the trip 3 weeks after Yuri Gagarin. John Glenn became the first American to orbit Earth, 10 months after Shepherd's flight.

****

The first woman launched into space was VALENTINA TERESHKOVA who orbited Earth 49 times in June 1963.

****

Balloons to Jets:— the Conquest of the Sky

B.C. The legend of DEDALUS and ICARUS making wings out of feathers and wax. They flew to close to the Sun, the wax melted and they fell to Earth.

1452-1519. The life of Leonardo Da Vinci, one of the first designers of flying machines.

1783..... The MONTGOLFIERS, two French brothers sent a hot-air balloon aloft with 3 animals aboard; a sheep, a rooster and a duck. The King and Queen of France were among the onlookers.

The first manned flight was made December 21, by another two Frenchmen, De Rosier and D'arlandes. They reached a height of about 1000 metres and covered a distance of about 10 kilometres. They also used a hot-air balloon.

It was a Professor J. Charles who first thought of using Hydrogen in balloons. It was already lighter than air and would allow the "aeronauts" to stay aloft as long as they liked and to come down when they desired, not when the hot-air cooled.

1785..... The first air crossing of the English Channel in a Hydrogen balloon. On board were Jean-Pierre Blanchard and Dr. John Jefferies.

Later coal-gas was used in balloons instead of the highly dangerous Hydrogen. *Why is hydrogen dangerous? What do they use today?*

1794..... Balloons used in war.

1804..... Sir George Cayley built a glider. Later he built ones which carried a passenger.His very frightened Coachman!

1842..... William Henson built a monoplane with two propellors behind the wings to push it along. The propellors were driven by steam engine but it made the craft to heavy to fly.

1852..... Up to this stage, Ballooning was dependent on the wind. Henri Gifford fixed a steam driven propellor to his balloon and flew 27km. at an average speed of 9½ kms. per hour.

1857-1900 Many inventors designed and built airplanes. Most were gliders but by 1890, many had engines attached.

1896..... Otto Lilienthal flew 228 metres and as high as 21 metres before it crashed and killed the pilot.

In Australia, Lawrence Hargrave(look at the back of a $10.00 note.) built a large 'box' kite. This was the start of a new idea in airplane design.

1903.....10:35 a.m. December 17 at Kitty Hawk, U.S.A. Orville Wright watched by his brother Wilbur left the ground in apetrol driven motor and flew 36 metres. Later that day he flew 260 metres.

1905..... By 1905, the Wright Brothers had built a airplane which could stay in the air for half an hour, turn and fly a figure of eight pattern.

1909.....On July 25, Louis Bleriot flew across the English Channel in a monoplane. Bleriot;s plane had the propellor and engine mounted in front. The Wrights' plane was a bi-plane and had the engine and propellor mounted behind the pilot.

What is the difference between monoplane and biplane?

1913.....Igor I. Sikorsky built and flew a 4 engine plane.

1914.....The first all metal plane was built and flown.

1914-1918...World War I and the plane became a weapon of war. The most famous flyer of the war was *The RED BARON. See what you can find out about him.* Balloons were again used for "spotters" and as protection from air attacks.

1920-1935 The golden era of flying where daredevil pilots would try to fly anywhere and everywhere.

.....1919 London to Darwin in 27 days, by Keith and Ross Smith.

.....1927 The first SOLO crossing of the Atlantic by Charles Lindberg. New York to Paris in 36 hours.

.....1929 The hydrogen filled airship, *GRAF ZEPPLIN* flew around the World.

.....1931 The first non-stop flight across the Pacific.

.....1932 An airship passenger service between Europe and South America. Amelia Earhardt became the first woman to fly the Atlantic

.....1933 First airplane flight around the world by Wiley Post.

1937..... *The Hindenberg,* A German airship, again filled with hydrogen crashed on landing in New York killing 36 people.

This was the end of airships as method of flight. Today they are re-appearing but with another gas.

1939-1945 World War II

.....1939 The first JET aicraft built and flown by Germany.

.....1940 The "Battle of Britain" with the airplane the dominant weapon.

.....1941 Japan attacked Pearl Harbour with Airplanes taking off and landing on ships.

.....1942 The first American jet flew.

.....1944Jets first used in War

The first rockets used in warfare. The V_2 rocket launched by Germany.

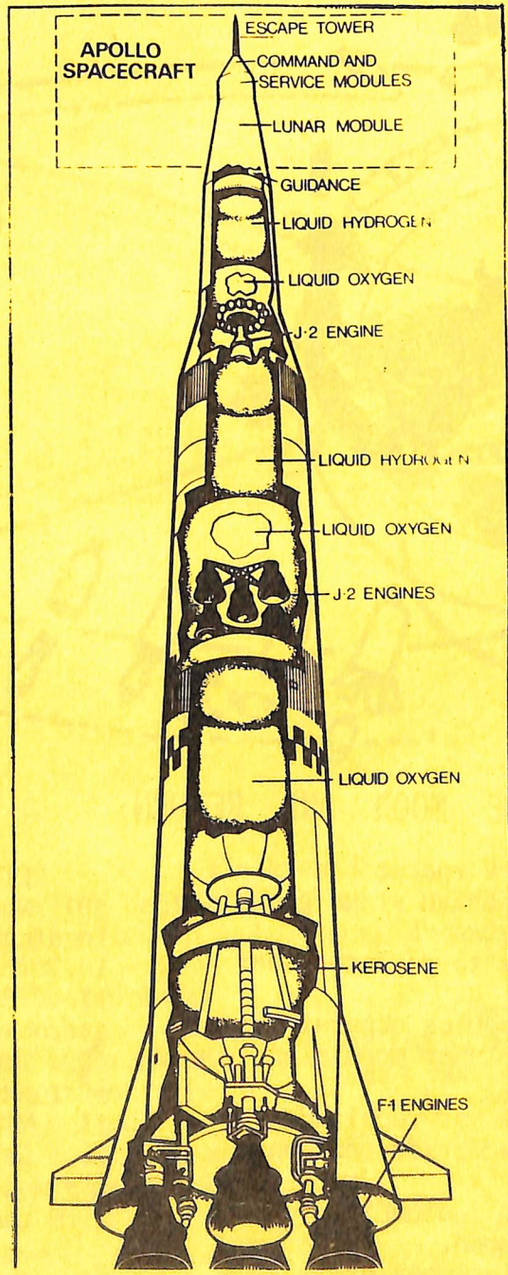
....into the Space Age.

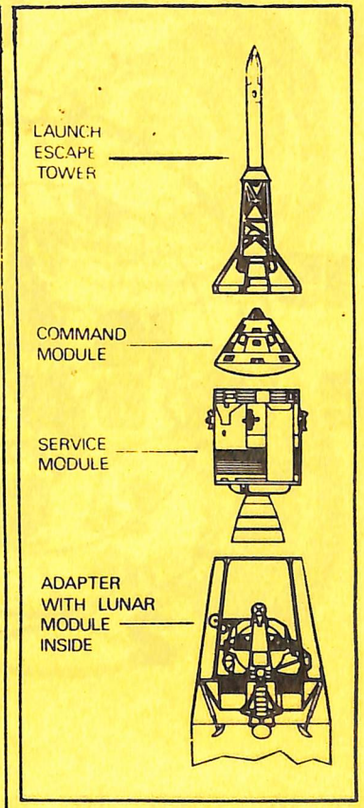
1947.....The first *Supersonic* flight by a human being. This was made by Charles Yeager in a Bell X-I rocket plane.
1949..... World's first'Round the World NON-STOP flight.
1952..... The first jet passenger service commenced in a De Havilland Comet.
1957..... October 4, Russia lauched Sputnik I into orbit around the Earth. This was the first artificial satellite of the Earth. Today there are "hundreds" floating around.
1958.....The Boeing 707 was first put into service as a passenger jet
Explorer I launched by the U.S.A. It was their first satellite.
1959.....Russia launched the first rocket bound for the moon. It missed and now orbits the sun..
1960..... Russia launched the first "spaceship".
1961.....April 12....*YURI GAGARIN* of the U.S.S.R. beame the first human to go into space and orbit Earth.
May 5. *ALAN SHEPHERD* (U.S.A.) took a 15 minute sub-orbital flight across the Atlantic.
1962.....February 20...*JOHN GLENN* became the first American to orbit Earth.
1966.....January 31 U.S.S.R. (Russia) *Luna 9* made the first soft landing on the Moon.
1967.....U.S.A. commenced the *APOLLO Series* with the aim of putting a man on the moon by 1970.
1968.....December 21....Apollo 8 was launched for man's first *Lunar Flight*. On board were F. Borman, W.Anders and J. Lovell Jnr.
Apollo 8 orbited the Moon and returned to Earth. It is also sad to note that the original astronauts of Apollo 8 were killed in a fire on the Launch Pad some months earlier in a practice run.
1969.....May 18.... Apollo IO with T.Stafford, E. Cernan and J. Young aboard was launched. Destination.....to orbit the moon and test the lunar module.
July 16...Apollo II launched. On board, Neil Armstrong, Edwin Aldrin and Michael Collins bound for lunar touchdown.
July 20 (July 21 Aust. time.) Neil Armstrong placed his left foot on the moon and said,

"One small step for man, One giant leap for mankind"

A few minutes later Edwin Aldrin joined Armstrong on the surface of the moon.

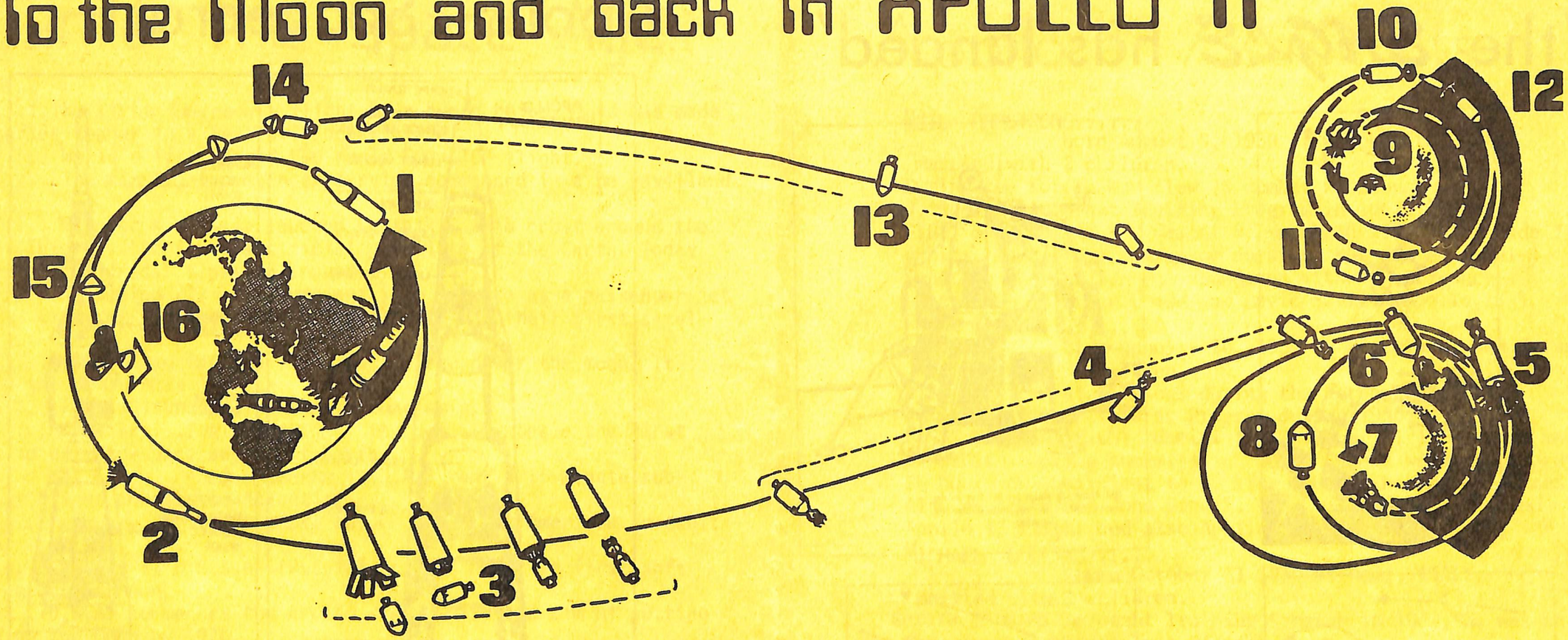
Apollo Spacecraft:





Left; The giant Saturn V rocket which carried man out of Earth's gravitational pull and into Space.
Above; The Apollo Spacecraft and the various sections which allowed man to walk on the Moon.

To the Moon and back in APOLLO 11



STEP BY STEP TO THE MOON AND RETURN:

1. The three-stage Saturn V rocket blasts off from Cape Kennedy, and the third stage goes into orbit.
2. Third stage re-ignites to go into Lunar trajectory.
3. Command and service modules separate from third stage, dock with the lunar module and continue on to the moon.
4. Mid-course corrections as required.
5. Retro thrust slows spacecraft for lunar orbit.
6. "Eagle" separates from "Columbia".
7. "Eagle" lands on the moon.
8. "Columbia" continues in lunar orbit.

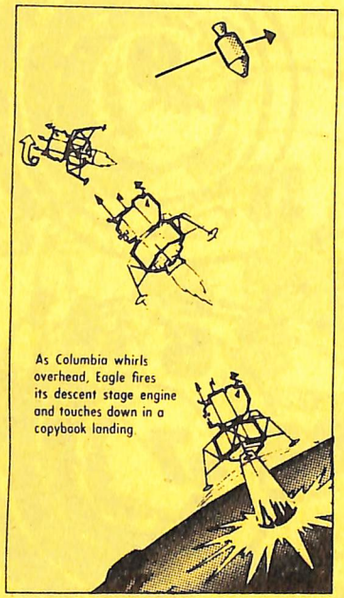
RETURN TO EARTH.

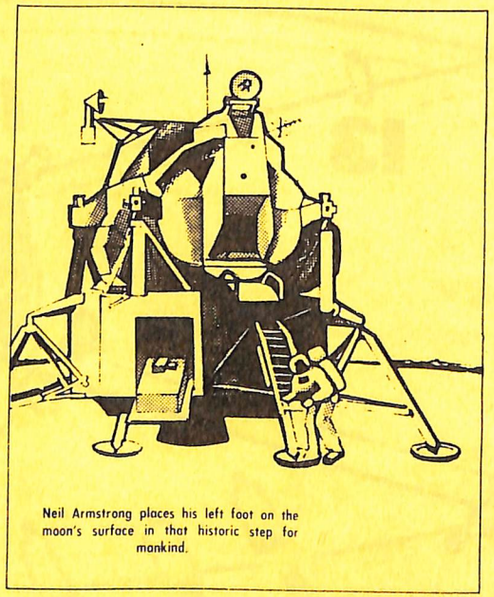
9. Moon take off by "Eagle", leaving behind the landing section which has acted as a launch pad.
10. "Eagle" docks with "Columbia".
11. "Eagle" is discarded once the two lunar astronauts have re-entered "Columbia".
12. The spacecraft engine fires to break out of lunar orbit and into an Earth trajectory.
13. Mid-course corrections as required.
14. Service module is abandoned and the command module turns around so that the heat shield hits the atmosphere first.
15. 25,000 m.p.h. (40,000 km.) re-entry.
16. Parachutes open for splashdown.

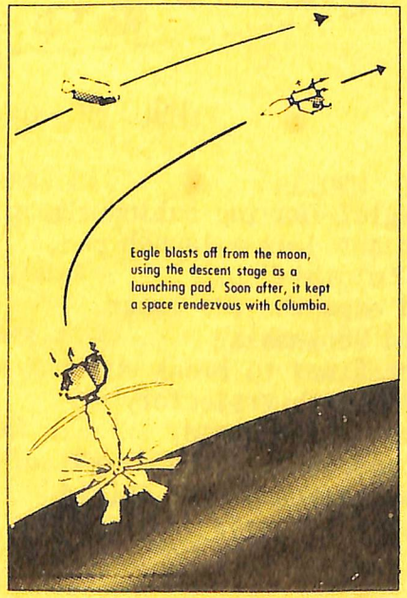
NB. The command and service modules on Apollo II were known as Columbia, while the lunar module was known as Eagle.

See if you can find out the names used for Apollo I2, I3, I4, I5, I6 and I7.

"the *EAGLE* has landed"







Apollo 11 Astronauts:

NEIL ARMSTRONG.....
born August 5, 1930 at Wapokoneta, Ohio.
married with 2 children.
During the Korean War flew 78 combat missions.
Joined the Aeronaut Training Program in 1962.
FIRST SPACE MISSION: Gemini 8, March 16 1966 which made 7 orbits. Made the first space docking, but due to a malfunction the mission was abandoned with an emergency splashdown. Also on board was David Scott. (Apollo 15)

EDWIN ALDRIN.....
born January 20, 1930 at Montclair, New Jersey.
married with 3 children.
Also flew combat missions during the Korean Conflict.
Joined Aeronaut Training Program during 1963.
FIRST SPACE MISSION: Gemini 12, November 11 1966 which made 59 orbits. During the mission set a "space walking record" of 5½ hours or equivalent to walking around the World 3 times. Also on board was John Lovell. (He was on the ill-fated Apollo 13 flight and also Apollo 8)

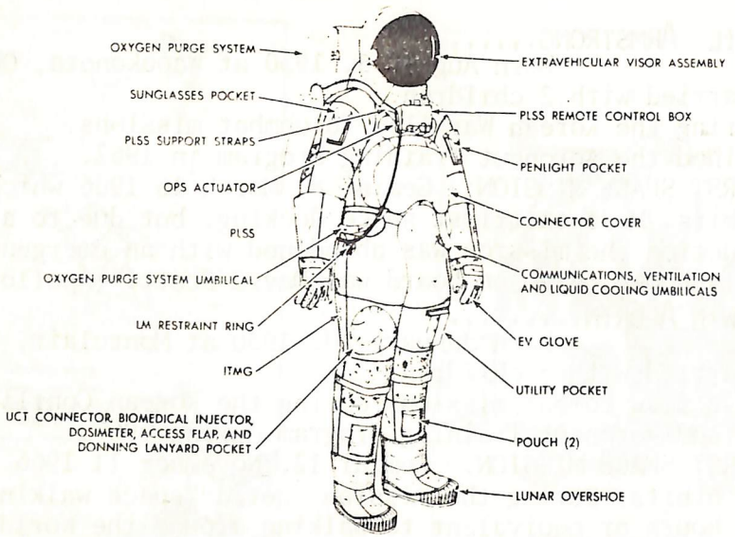
MICHAEL COLLINS.....
born October 31 1930 at Rome, ITALY.
married with 3 children.
Before joining Aeronaut Training Program in 1963, he was an Experimental Flight-Test Officer.
FIRST SPACE MISSION: Gemini 10, July 18 1966 which made 43 orbits. Also on board was John Young, one of only 3 astronauts to make 2 Lunar flights. *Who were the other 2?* (Apollo 10 and 16)


Neil Armstrong


Edwin Aldrin


Michael Collins

The Lunar Suit.



The suits worn by Astronauts Neil Armstrong and Edwin Aldrin have been described as *'self-sufficent space ships!*

The space suit itself weighs more than the astronaut wearing it; 90 kilograms earthweight. While the two astronauts weigh about 80 kilograms each. But on the Moon, everything weighs about *one-sixth* what it would on Earth. So while on the moon, the astronauts can move about with comparitive ease.

The Lunar Suit was worn only during the actual moon walk -different suits were worn by the astronauts to and from the moon. The suits worn for moon exploration carried their own electricity, water, oxygen, fan, refrigerator -indeed, space ships in the form of clothing. Also, the moon suit included a sophisticated two-way radio. The radio allowed the astronauts to talk to each other. At the same time it sent back signals to Mission Control in Houston *Where is Houston?*

The Lunar Suit

Nine types of information were returned to Earth, including the astronauts' electrocardiograms. *Find out what an electrocardiogram is.*

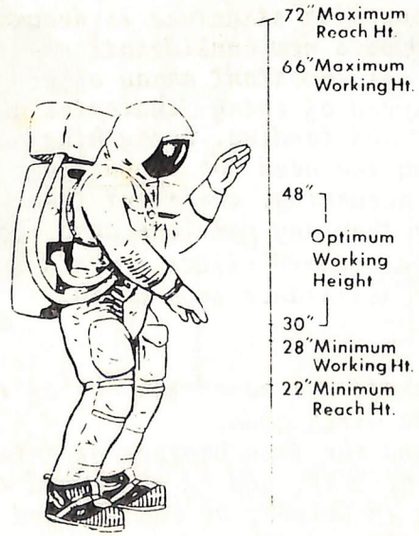
The electric power was produced by an array of silver -zinc batteries in a container about the size of a loaf of bread. The air they breathed was kept clean by *Lithium hydroxide* and activated charcoal.

The suits cooling unit was cooled by the sublimation of a thin layer of ice in a honeycomb chamber through which the suit's oxygen and water passed continually.

From skin to the last outer layer of clothing the astronauts were dressed like walking thermos flask.

In place of underwear, they wore a nylon covering with a network of vinyl tubes through which water ciirculated for cooling. Over that, a pressure garment to give the astronaut his own atmosphere. Over that, an *integrated thermal micrometeoroid* garment to protect against fire, abrasion, temperature extreme and whatever else.

Over their heads, the astronauts wore clear plastic pressure helmets with adjustable visors.



Why APOLLO?

The following article is a Press Release from N.A.S.A., supplied by the Science Museum of Victoria. It best explains why the name Apollo was chosen.

It took 400 years of trial and failure, from da Vinci to the Wrights, to bring about the first flying machines, and each increment of progress since has become progressively more difficult.

But nature allowed one advantage: air. The air provides lift for the airplane, oxygen for engine combustion, heating and cooling, and the pressurized atmosphere needed to sustain life at high altitude. Take away the air and the problems of building the man carrying flying machine mount several orders of magnitude The craft that ventures beyond the atmoshere demands new methods of controlling flight, new types ofpropulsion and guidance, a new way of descending to a landing, and large supplies of air substitutes.

Now add another requirement: distance. All of the design and construction problems are made more difficult. The many tasks of long distance flight call for a larger crew, hence a greater supply of expendables. The functions of navigation, guidance, and control become far more complex. Advance systems of communication are needed. A superior structure is required. The environment of deep space imposes new considerations of protection for the crew and the all important array of electronic systems. The much higher speed of entry indicates an entirely new approach to descent and landing. Everything adds up to weight and mass, increasing the need for propulsive energy. There is one constantly recurring, insistent theme: everything must be more reliable than any previous aero space equipment, because the vehicle becomes in effect a world in minature, operating with minimal assistance from Earth.

Such is the scope of Apollo.

Appropriately, the spacecraft was named for one of the BUSIEST and most VERSATILE of the Greek gods.

Apollo was the god of light and the twin brother of Artemis, the goddess of the Moon. He was also the god of music and the father of Orpheus. At his temple in Delphi, he was the god of prophecy. Finally, he was also known as the god of poetry, of healing and of pastoral pursuits.

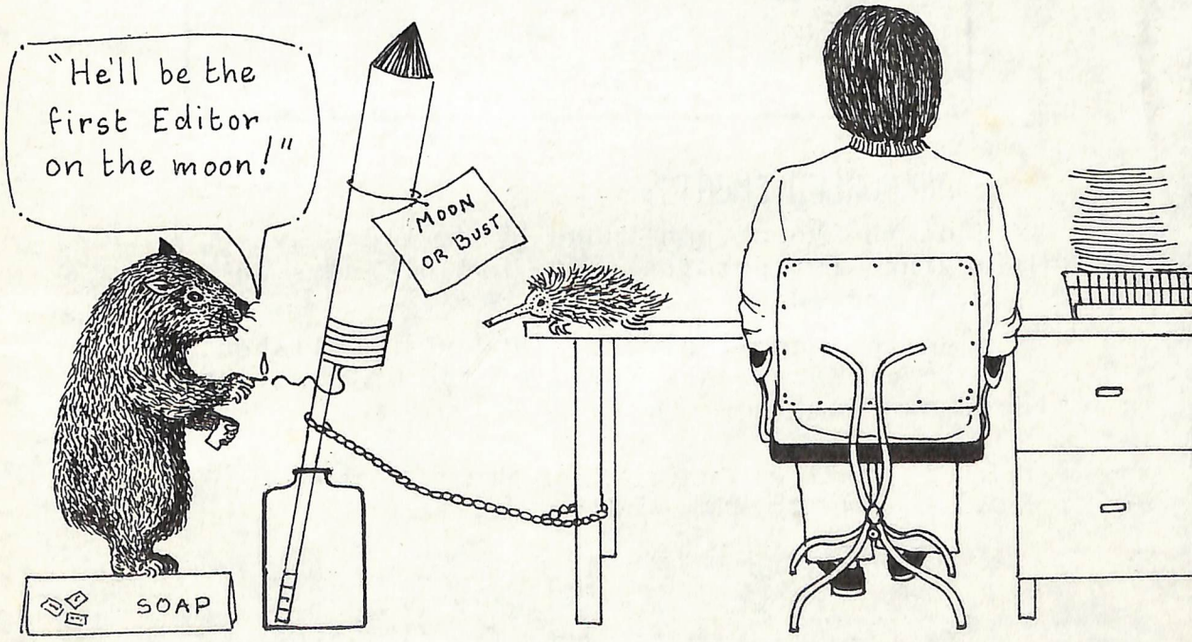
APOLLO DISPLAY.

During late July, the Science Museum of Victoria, Swanston Street, Melbourne; will have a special display to mark the 10th Anniversary of Apollo II. Among the items on display will be one-third scale models of an Apollo Command Module, and a Lunar Module. Also on display will be a model of a Lunar Suit.

****

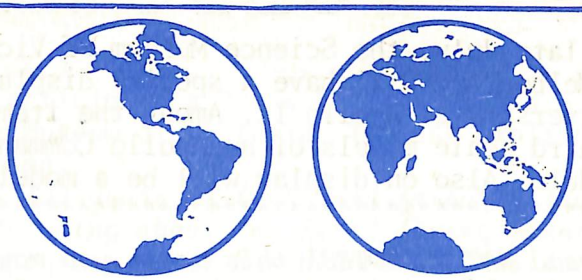
As you read NATURE NOTES' this month you may have noticed words typed out in this style. As we have no puzzles this month, we hope you will do some research instead. These are the words we would like you to research as we feel that they will help you to understand flight and space better. Thank-you.

EDITOR..



NATURE NOTES is a Ringwood Inspectorate Publication produced at Ringwood East Primary School, Victoria. (03) 879 1263
JULY 1979.....

lunar plaque



HERE MEN FROM THE PLANET EARTH
FIRST SET FOOT UPON THE MOON
JULY 1969, A. D.
WE CAME IN PEACE FOR ALL MANKIND

NEIL A. ARMSTRONG
ASTRONAUT

MICHAEL COLLINS
ASTRONAUT

EDWIN E. ALDRIN, JR.
ASTRONAUT

RICHARD NIXON
PRESIDENT, UNITED STATES OF AMERICA

ACKNOWLEDGEMENTS:

"Man on the Moon" published by Herald Gravure, Melbourne for permission to use diagrams on pages 7, 8, 9 and 10.

"Man on the Moon- July 20, 1969 AD, published by M.F. Enterprizes, New York for the information on the Lunar Suit.

SCIENCE MUSEUM of Victoria, for the information from N.A.S.A. about the name APOLLO.

For further reading on Space Travel, WORLD BOOK ENCYCLOPEDIA has an excellent article.
So-Sz Volume 18. Space Travel.

NATURE NOTES is registered at the G.P.O. for transmission as a Periodical:- Category B.