AUSTRALIA'S OVERSEAS AIRLINE

BOEING 707

WELCOME ABOARD YOUR

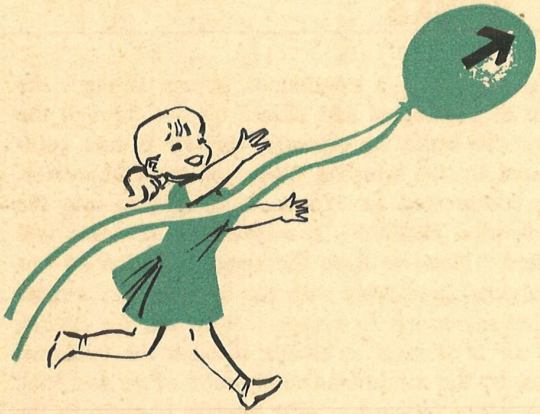
QANTAS JETLINER

WE are delighted to have you aboard the new Qantas 707 Jetliner. This may be your first flight in a pure jet aeroplane. If it is, then you are now enjoying an entirely new mode of air travel, far above anything you have ever known before. If you've already been fortunate enough to experience jet flight, then you've been looking forward to this trip with eager anticipation, fully realising the pleasures in store.

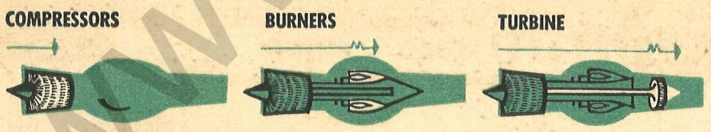
The object of this little booklet is to define, very briefly, the features of this new airliner and the many facilities which are available to you. Please retain it as a souvenir.

THE PRINCIPLE OF THE JET

Let's begin at the beginning and explain the principle of the pure jet or turbo jet engine as it is technically termed.



Perhaps the simplest way to describe the principle of the jet is to use the homely illustration of a balloon. As children, most of us have taken great delight in inflating a balloon with air and suddenly releasing it by letting go the stem. The rush of escaping air seemed to push the balloon forward. In actual fact it was not the escaping air that caused it to move but the remaining air inside the balloon which was pushing in an opposite direction. (Remember Newton's well-known Third Law of Motion, which states that for every action or force in one direction there must be an equal force or action in the opposite direction.) It was great fun while it lasted but, in no time, the small amount of air inside the balloon was exhausted. The balloon had to be reinflated. We realised that to sustain the motion, we would have had to maintain a constant supply of air. This, of course, has been accomplished in the case of the jet engine.

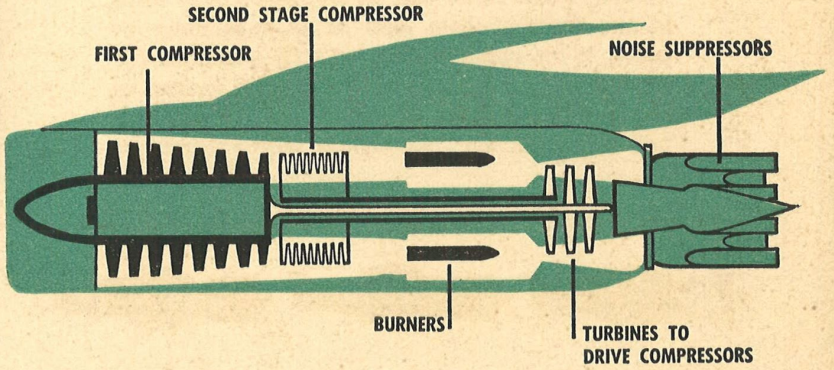


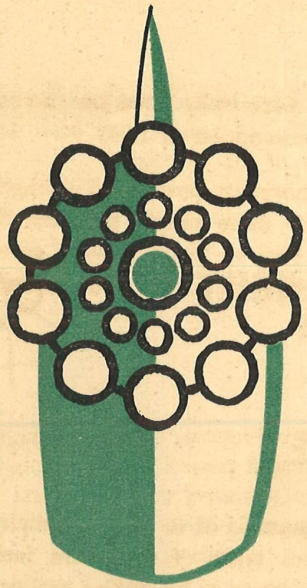
THE JET ENGINE AND HOW IT WORKS

Air is fed in a continuous stream through the front of the engine and passed on out through the rear. To build up pressure, this air is first compressed by the whirling blades of the compressor. The compressed air expands and, moving into the combustion chambers, is mixed with kerosene and ignited. Now we have the same condition as was mentioned previously with the balloon . . . a mass of hot air trying to escape. With the jet engine, this air is allowed to escape through the tailpipes. Thus, by the continuous combustion of air and fuel, tremendous forward-moving impulse is given to the aeroplane.

Once the engines have been started on the ground, combustion is automatic. The kerosene is ignited by fire already in the combustion chambers. The spark plugs are used only in starting the engines.

We should also mention that before the air rushes through the tailpipes, it goes through the turbines which rotate a shaft connected with the compressor in the front of the engine. Once the compressor is





started on the ground, the process becomes continuous. Because the turbine in the rear spins, the compressor in the front of the engine spins. But the turbine itself spins because the compressor has fed it hot air through the combustion chambers.

The amount of kerosene burned decides the amount of thrust or forward motion developed by the engines, and this is controlled by the throttles or thrust levers in the cockpit.

We might mention too that any problems arising from objects fouling the air intake has been completely overcome. The jet engines of the 707 have been subjected to the most rigorous tests. In one instance, dead chickens were fired from special cannons right into the engines to simulate the circumstance of running into a stray flock of birds. In another, two-inch ice balls were also projected at force into them. In both cases, engine operation was not affected. Other tests, far more exacting than the engines would ever be likely to undergo in the normal course of operation, were also passed successfully.

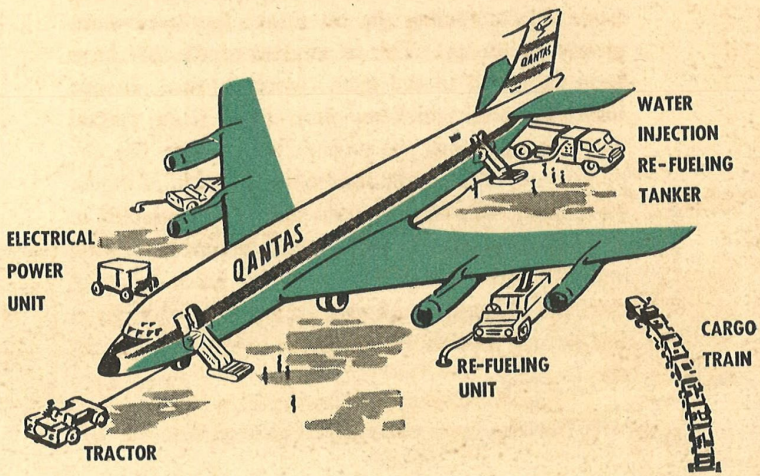
It has also been conclusively proved that the 707 Jetliner could be successfully flown on two engines without undue consumption of fuel.

For all their enormous power and strength, the jet engines are far more simple than the former piston engines. They've fewer moving parts and so are far easier both to control and maintain.

WHY KEROSENE?

A jet engine, because of its very simplicity, can operate on various types of petroleum fuels but kerosene has been found to be best as well as being the least costly. Another important factor regarding kerosene is that it won't explode like petrol, even if there is leakage. The Qantas Jetliner can carry 14,502 imp. gallons of kerosene, more than sufficient to take you to your destination, plus ample reserves enables it to fly to alternate landing fields in the event of bad weather below.

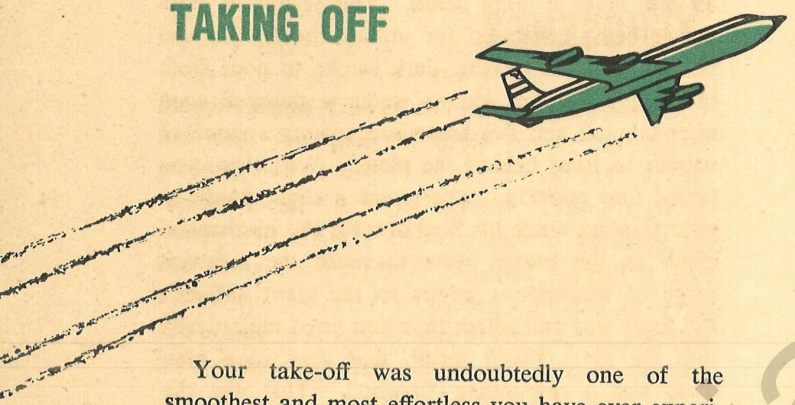
For all its great capacity, refuelling is fast and simple. Hoses which are connected under the wings can pump fuel into the huge tanks at the rate of 1,250 imp. gallons a minute.



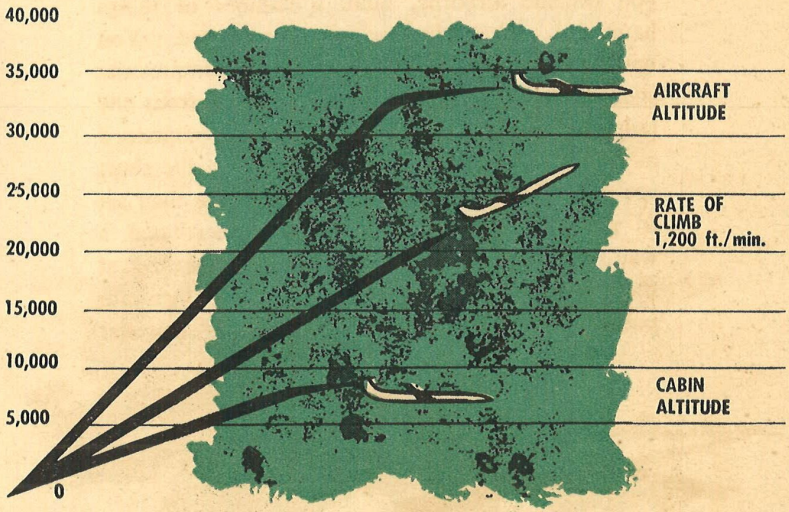
JET CHARACTERISTICS

Knowing something of the jet engine and how it operates helps you to appreciate that the Jetliner has certain characteristics which are distinctly different from those of the conventional aeroplanes. Some of these you've possibly noted already.

TAKING OFF



Your take-off was undoubtedly one of the smoothest and most effortless you have ever experienced. You probably weren't even aware of the exact moment you left the ground, but from the time you entered your Jetliner until the moment you became airborne, quite a number of things happened. First, the engines were started. You may have heard a slight whine as the compressors sucked in air. Dark smoke discharged from the tailpipes as the fuel ignited with the compressed air. All four engines were started within the short space of about two minutes and you were then set to go. Perhaps traffic conditions necessitated a wait. If this were so, you probably waited at the gate before moving into the runway. Once into position for take-off an experienced air traveller would have noticed that there was no wait for engine "run-up" as is customary with piston driven aircraft, and none of the accompanying vibration. Jet engines don't need to be warmed up. The moment all engines are started, your Jetliner is ready and anxious for flight. The engines, are however, given a boost of power for take-off. This takes the form of water injection. About 625 gallons of water are injected into the engines to cool the air and make it more dense. This results in extra power being generated for utmost thrust. It also has the effect of causing dark smoke to pour from the tailpipes. Any excess water is dumped soon after take-off and this sometimes causes a cloud of vapour to form behind the plane. Well then, you taxied into position. There was a slight pause as your Captain made his final checks; the mechanical clank as the brakes were released; the resultant surge of tremendous power as the giant airliner's full force was unleashed; then you lifted majestically into the air. You'll recall, that very soon after there was a resounding "thump". This was the landing gear being retracted and locked securely into place.



UP AMONG THE STARS

Well, not quite, but you've certainly climbed much higher than you do in a conventional aeroplane. If you've already attained normal cruising height, you are floating along at an altitude somewhere between 25,000 and 40,000 feet. Your Jetliner quickly climbs to this height (at a rate of over 1,000 feet a minute) for two perfectly good reasons. Firstly, because it encounters less air resistance and so travels faster and on less fuel. Secondly, because it invariably finds airways that are serene and untroubled by wayward weather conditions. The clouds, if any, are miles beneath you and the sky above is a deeper, clearer blue since dust and moisture are also miles below. *Should* any weather disturbance penetrate this upper atmosphere, be assured your Captain will be well forewarned through his weather radar and will guide your airliner into the smoothest possible channels.

Now a word about air-conditioning and pressurisation. These are recognised as being the finest ever produced in an airliner. The temperature outside is well below zero, but inside you're just comfortably warm, and even though you're flying at between 25,000 and 40,000 feet, pressure in the cabin will be equivalent of that experienced at or below 8,000 feet.

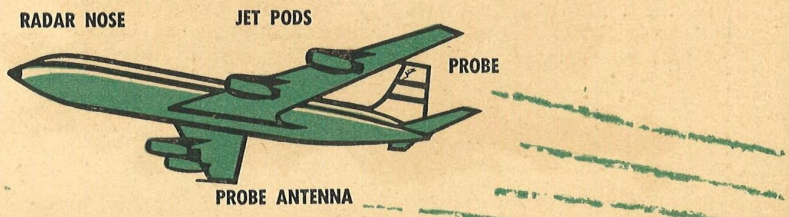
Incidentally, since the air pressure inside the cabin is greater than that outside, it was necessary

for the designers of the 707 to design the fuselage so that it would keep the pressure safely inside: so the skin and frame of the 707 are specially constructed for this. There is also a strong network of ribs or double straps laced inside the skin. The whole body of the plane, including the triple-paned windows, was subjected to extreme pressure tests which more than proved its sturdiness and endurance. Doors, of course, cannot be opened whilst the plane is in flight, and function like huge stoppers.

THOSE STREAMLINED WINGS

Have you, by any chance, been watching the wings? The tips have probably appeared to flex up and down quite considerably from time to time. There is good reason for this. It's quite intended that they should, for they perform the self-same function as shock absorbers do on your car. They smooth out bumps and jolts caused by updrafts and downdrafts. All aeroplanes have this wing flexibility to some extent but 707 Jetliners have exceptional wing flexibility. That's why they ride so easily and so effortlessly.

You know, of course, that the wings are swept back to give less resistance at high speed. Your Jetliner's normal cruising speed is about 525 m.p.h. or, if you like to be technical and like the sound of it, you can say you are travelling at about Mach .8. (The speed of sound varies with the air temperature.) At 59°F., it is 763 m.p.h. and at the temperature in which you are now flying it would be only 662 m.p.h. The speed of sound is, as you



know, referred to as Mach 1.0. Speeds such as these cause the air to strike the plane with considerable force, which, in turn, produces a lot more "drag" or air resistance. Wings swept back at an angle of 35 degrees reduce drag substantially. You may have noticed before you boarded the plane the two probe-like antennae . . . one on the starboard wing and one on the tail. Both point forward into the wind and create less drag than former types.

The engines, of which we have already spoken, are housed in those large pods under the wings. You'll notice that heat waves are radiating out behind each one, perhaps even a vapour trail well back. If you see an odd puff or two of black smoke come away from the engines, it's just excess carbon from the fuel nozzle being expelled.

Engine noise has been reduced to a minimum. Inside the cabin there's some engine noise toward the rear of the plane, very much less in the forward part. Two factors contribute to this lessened noise inside the cabin; the engines are located further out on the wing away from the fuselage and soundproofing has been decidedly improved. Actually the familiar high pitched whine of the jet engine is located well behind the engines, so that passengers miss most of it when the plane is in flight. To minimise this whine so far as people who live and work near airports are concerned, the Jetliner's engines have been specially fitted with sound suppressors. These are composed of 21 tubes which can be seen in the tailpipes of the engines.

If you are travelling at night, you'll notice the reflection from the flashing red light of the revolving beacon. This is something carried by all commercial airliners. A light may also be shown along the wings and engine housings.

A point of interest is the fact that the Jetliner's electrical system has a capacity of 120 kilowatts, sufficient to supply the peak load for 30 to 40 family-size homes.

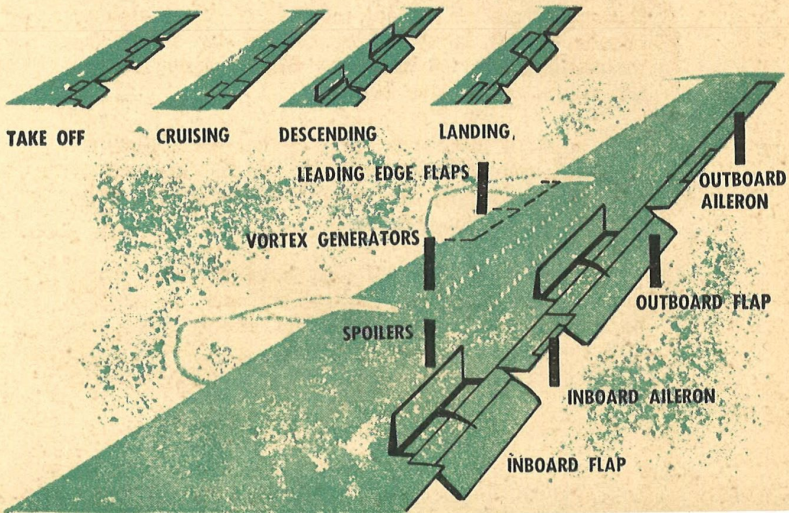
The practised eye will also have detected that the 707 has additional control surfaces, as might be expected on a plane that flies almost twice as fast as most piston-driven airliners; however, the principal of control and direction are essentially the same.

On the trailing or rear edge of an aircraft's wings are the *ailerons*. These, with the rudder on the tail control turns. The 707 Jetliner has *two* sets of ailerons on each wing. Both inboard and outboard ailerons are used to control the banking angle in making turns at low speeds. At higher speeds, the outboard ailerons are not used.

Further assistance in making turns is given by the *spoilers*. There are two spoilers on the top of each wing. In making a right turn, for instance, the left wing is lifted and the right wing dipped. It's interesting, particularly where children are concerned, to watch for this.

Features not found on conventional aircraft are the *leading edge flaps* on the wings (which improve control characteristics during low speed flight) and the adjustable horizontal stabilizer (which keeps the plane level at high speeds).

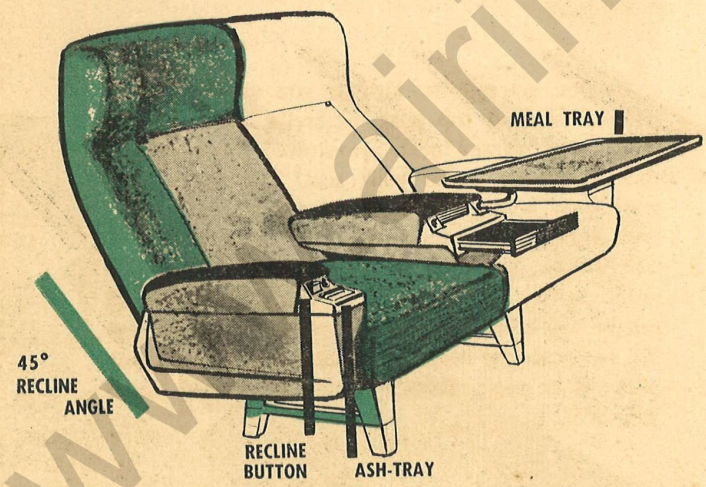
You may have noticed the things which look something like playing cards stacked on edge on the top of the wing; these improve the flow of air over the wing and increase the effectiveness of the control surfaces on the trailing edge. Called *vortex generators,* they reduce drag by cutting the thickness of the friction-produced "boundary layer" of "dead" air. This "boundary layer" of "dead" air is a cause of drag in itself.



KNOWING YOUR SURROUNDINGS

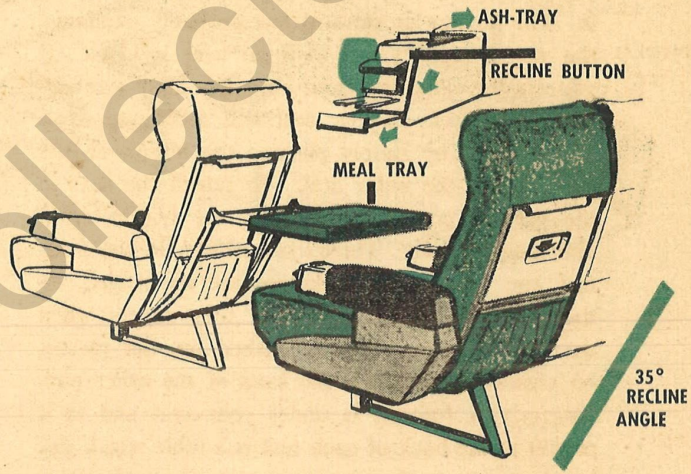
YOUR SEAT

We'll have more to say about the way your Jetliner behaves when we come to discuss landing, but let's return to you for the moment. By this time, you've discovered just how comfortable your seat is. The hostess or steward has probably explained the way it adjusts but we'll go over it again. If you are travelling in a four-abreast seating arrangement, the back of your seat will recline to a 45 degree angle by simply pushing the button on the top edge of the outer arm. To return the seat to the vertical position, just press the button again and lean forward. There's an ashtray in the armrest, too. (Smoking regulations are unchanged, by the way . . . cigarettes at any time except when the "No Smoking" sign is flashed on, but please, no cigars or pipes, for the sake of the other passengers.) A footrest is under your seat and in a pocket at the back of each seat is a table which can be plugged in to the arm rests; a smaller table slides out from the centre arm.



A six-abreast seating arrangement provides seats which recline at an angle of 35 degrees by operating a lever attached to the seat arm. Ash trays are also in the arm rests. A table unfolds from the back of each seat and a foot rest can be found under the seat.

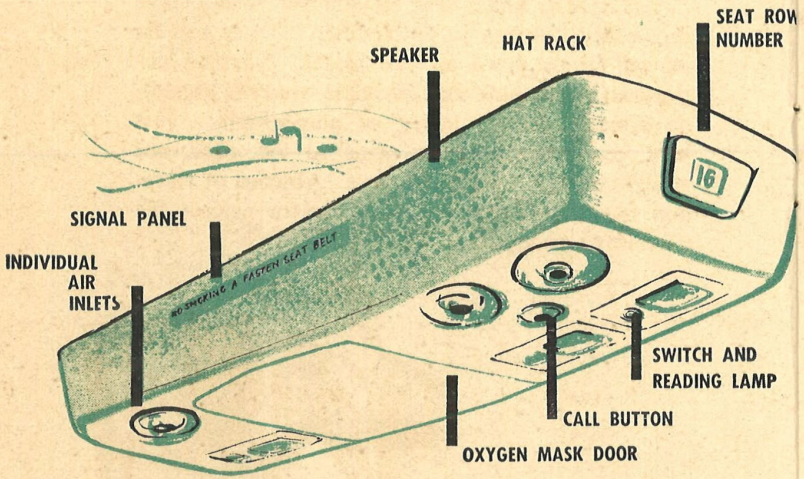
A point to remember: If you want to doze, fasten your seat belt loosely first. Should it be necessary to fasten belts whilst you are asleep, the attendant won't need to disturb you.



THOSE ELEVATED RACKS

As you entered the airliner you were probably relieved of your top coat, umbrella, etc., and the things you wanted near are stowed away on the rack above or under your seat. In addition to your own belongings blankets are placed in the rack for your convenience. The rack has been made wider, so that articles will be accommodated more easily. It is also placed much higher so tall people won't bump their heads when they stand up. We ask that you keep only light articles in the rack —heavy or hard articles should be placed under your seat.

YOUR PERSONAL SERVICE UNIT

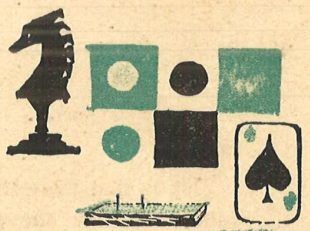


This is that interesting arrangement of dials and buttons directly above you. The diagram shows you what each is for. The air outlet, for instance. You can regulate the flow as you wish. Then there's your individual reading light with its switch beside it. The service call button is near that again. You've already noticed the "No Smoking" and "Fasten Seat Belt" signs and the loudspeaker through which announcements have been made and soft music relayed. The music comes to you from a tape recorder, by the way. The other item in your service unit is the oxygen mask, which it's very unlikely will ever be in use. Should they ever be needed, the little door in the units will open automatically and an oxygen mask be released for each passenger.

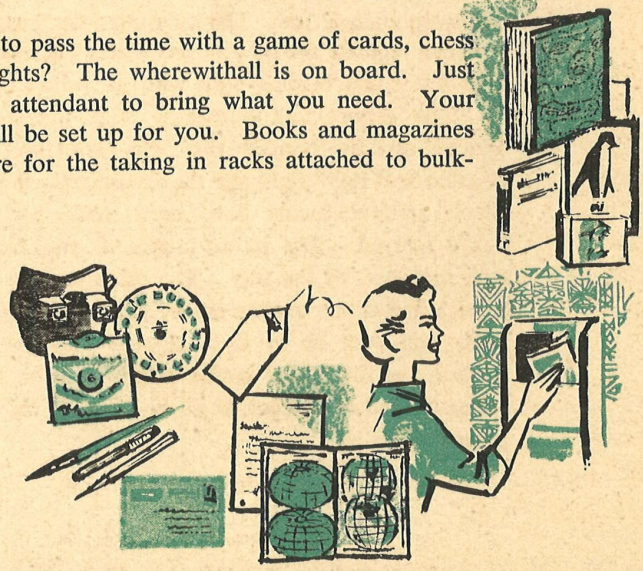
A WORD TO PHOTOGRAPHERS

You'll have noted that streamlined shades have superseded curtains in the Jetliner. These can be moved up or down as you please. Camera enthusiasts please note that the triple windows present no difficulty in the taking of photographs. Just hold your camera at an angle to the glass, not straight at it, to avoid reflection. Absence of vibration means you can rest your camera against the window to steady it.

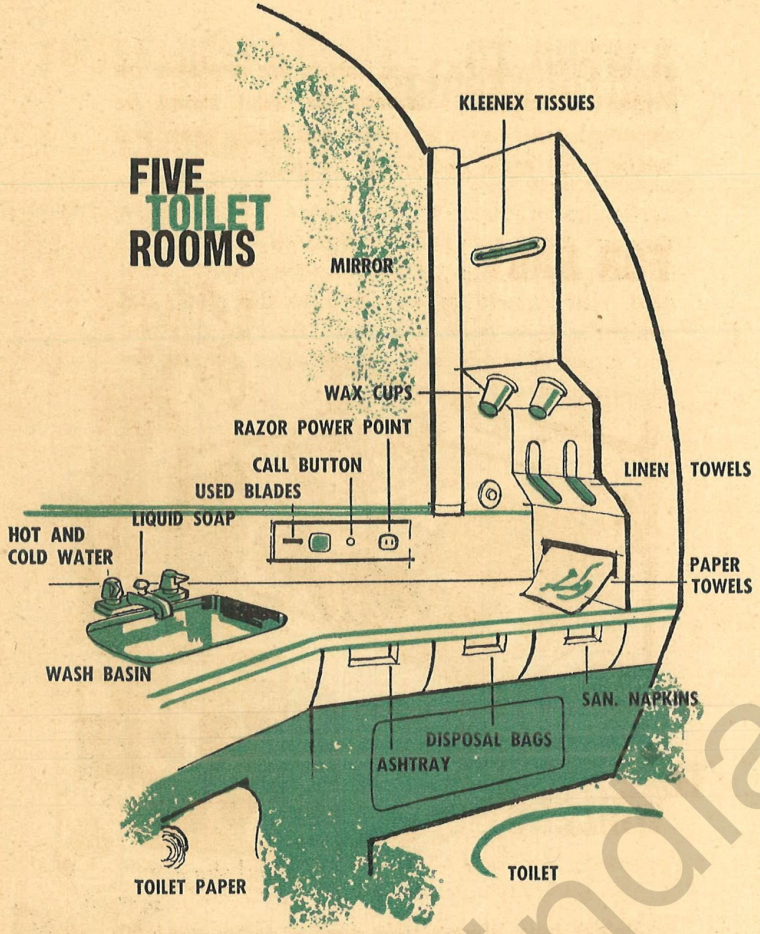
TIME WHILERS



Like to pass the time with a game of cards, chess or draughts? The wherewithall is on board. Just ask the attendant to bring what you need. Your table will be set up for you. Books and magazines are there for the taking in racks attached to bulkheads.



FIVE TOILET ROOMS



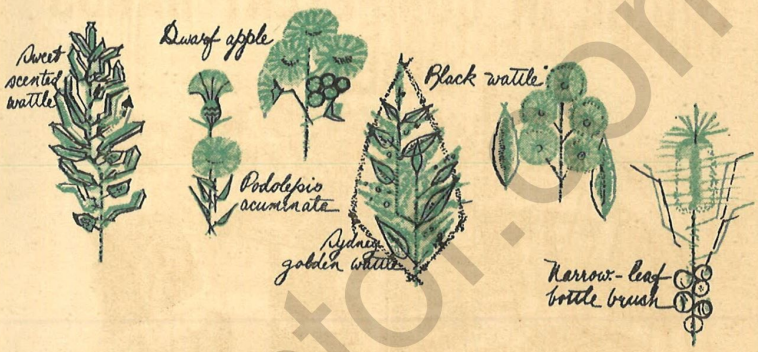
The five toilet rooms on the 707 Jetliner (two up front and three at the back) are compact and complete, with gleaming stainless steel and plastic fittings and large illuminated mirrors; towels, tissues and soap, etc., are in handy dispensers. For men who wish to shave, plugs are provided for electric razors (115 volts DC) and razors are available on request if required. Should the toilet rooms be occupied, your cabin attendant will gladly show you where other razor outlets are located.

FOR BABY

Babies have always been special passengers with Qantas and they've been particularly well catered for in the new Jetliner. Comfortable bassinets made of strong plastic and metal are available in a limited number. There is also a special baby amenity case carried when a baby is on board with all the necessary items, including regular baby foods, bottles, bibs, and disposable diapers. Special foods can be carried when arrangements have been made beforehand.

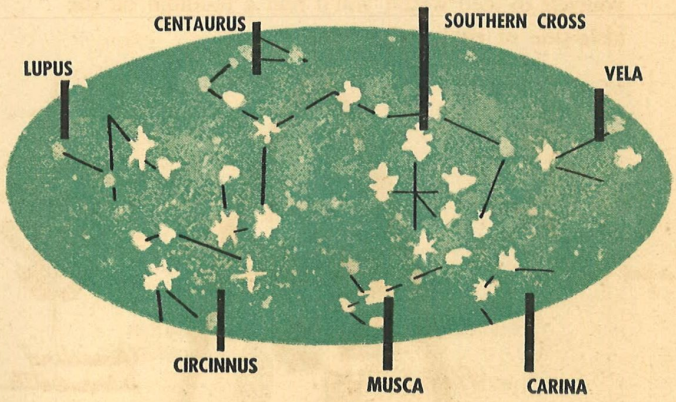
THOSE DELECTABLE MEALS

Perhaps you've already enjoyed a meal before reading this little booklet. If not, there's a treat in store. The twin galleys on the Jetliner are perfect kitchens in miniature and their many time-saving innovations facilitate faster, easier meal service. Small but important details are the fresh-coffee brewers, refrigerators, bun warmers, and warming plates to keep the coffee hot. If you'd like to help yourself to iced water, you'll find a fountain on the aisle-side of each galley unit.

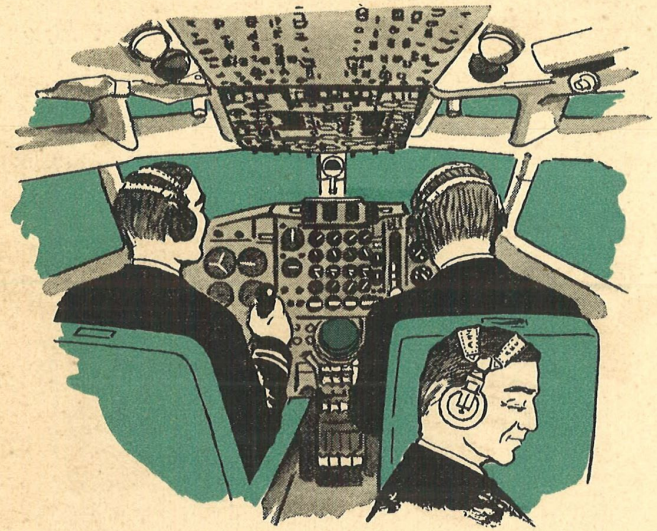


THE DECOR

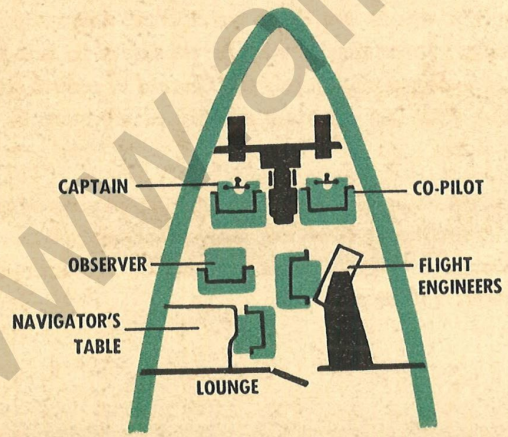
This you couldn't help but notice the moment you entered. It is so completely and radically different from former cabin decor schemes. The colours are light, luminous and planned for the different light angles of high altitudes. We'd particularly like you to notice the Australian touch found in wall panels which are patterned with exquisitely-drawn Australian wildflowers, and the aisle dome lights which during night flight, feature a star pattern representing a portion of the sky over Sydney at approximately midnight in April or 8 p.m. in June. The cabin is, of course, wide and spacious. Incidentally, so long as the "fasten seat belts" sign is not showing, you can move about the cabin quite freely.



YOU'RE IN COMPETENT HANDS



Your Captain and his crew are all men of long experience, specially chosen and trained for Jetliner operation. Their training has been long and exceptionally thorough. They are, moreover, wonderfully enthusiastic about their new aircraft. The 707 Jetliner is recognised with flying men all over the world as being simple to operate and remarkably easy to control. Cabin attendants are equally enthusiastic. Many of their tasks have been made easier and quicker. They've more time for the distinctive personal service which you appreciate so much.

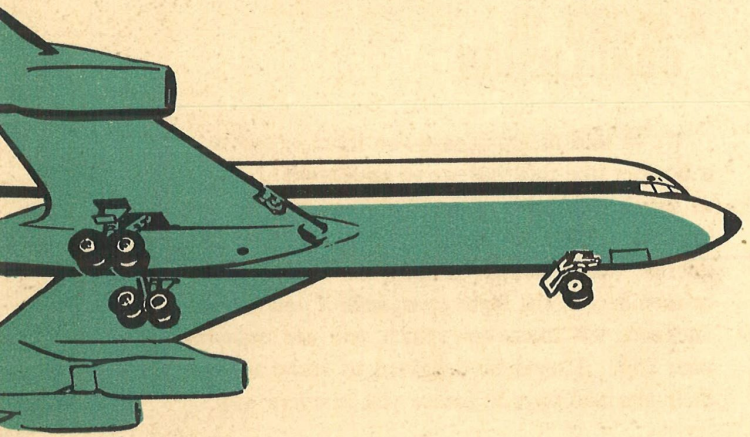


LANDING

You'll find it just as smooth and effortless as your take-off, but it's interesting to know something of the procedure just the same. This is, very briefly, what takes place. Firstly the Captain lowers the landing flaps and the wheels. You'll hear a definite roar as the wheels are lowered, caused by air rushing into the wheel well. There are quite a few wheels to be lowered by the way, ten in all; eight in the main landing gear and two in the nose. As soon as the wheels are down you'll hear their supports lock. Sometimes it may be necessary to bring the *spoilers* into play during the descent to reduce speed. You may feel a certain amount of vibration as this is done.

Just as your ascent was quick, so is your descent, but you'll very likely be unaware of this. When the wheels touch down, the speed of the airliner is about 150 m.p.h.

The Captain has two main devices to bring him to a smooth stop; the *brakes* and the *thrust reversers*. He can also raise the spoilers to their fullest extent to eliminate any remaining lift in the



wings. This has the effect of putting the plane's weight on the wheels.

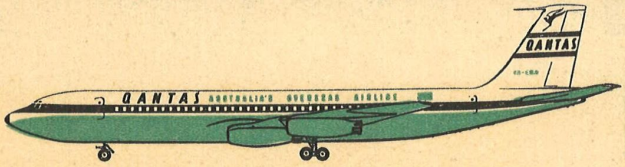
As you might expect, the brakes are a complex but highly efficient system. They are fitted with an automatic anti-skid device which, if it feels a wheel skid, automatically releases the brake on that wheel until it feels the skid stop, then re-applies the brake.

The *thrust reversers* (the other device which the Captain can call upon to help him ease the plane to a stop) deflect the exhaust gases forward, reversing the direction of the jet blast.

The principle is much the same as that employed when a garden hose nozzle is made to squirt water backward by placing the hand over the end. Your Captain may not always have to call upon his thrust reversers.

A WORD IN CONCLUSION

We've said as much as we've room to say in a booklet like this, but we've endeavoured to supply you with as much information regarding the new Jetliner as possible. If you've further queries, don't hesitate to ask your cabin attendants or members of the flight crew; and, if you feel inclined, tell them how much you are enjoying your trip. They'd be delighted to know since it is their aim and ours to please you in every way.



STATISTICS OF THE QANTAS JETLINER

Plane	Boeing 707-138.
Over-all length . . .	134′ 6″.
Wingspan	130′ 10″.
Height of Tail . . .	38′ 7″.
Max. Take-off weight .	247,000 pounds.
Engines	4 Pratt & Whitney JT 3C-6 13,000 pounds thrust per engine.
Cruising speed . . .	525 miles per hour.
Operating Altitude . .	25,000-40,000 feet.
Fuel Consumption . . (per hour, per engine)	380 gallons.
Take-off speed . . .	170 miles per hour.
Landing speed . . .	150 miles per hour.
Rate of climb	Average 1,200 feet per minute.

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QANTAS