The SST will reak confusion & pollution wherever it travels

By 1978, if all goes well, we should be able to climb into a very large delta-winged aircraft at Toronto International Airport (or its replacement) and streak across the Atlantic at 1,800 miles an hour, over twice the speed of sound, at 65,000 feet and arrive in Paris in under 3 hours. According to John H. Shaffer, head of the Federal Aviation Administration in the U.S., "We are going to see a one day world in which one can go from any point on the globe to any other point in the same day." Supersonic transports will travel in the atmosphere at speeds previously only accessible to specialized military aircraft and promise to solve our problem of handling the increasing amount of passenger traffic, which is tripling every ten years, by moving more people faster. Thousands of new jobs will be created by these highly sophisticated machines and there will be many exciting challenges to modern industry and engineering which will have to be met and mastered if the project is to succeed.

But, as you suspected, there are a number of major problems with this new technological sail on the horizon. Environmentally, economically and with respect to safety the SST as seen by many scientists and even President Nixon's Ad Hoc Review Committee on the SST is emphatically a bad thing whose development should be postponed if not cancelled.

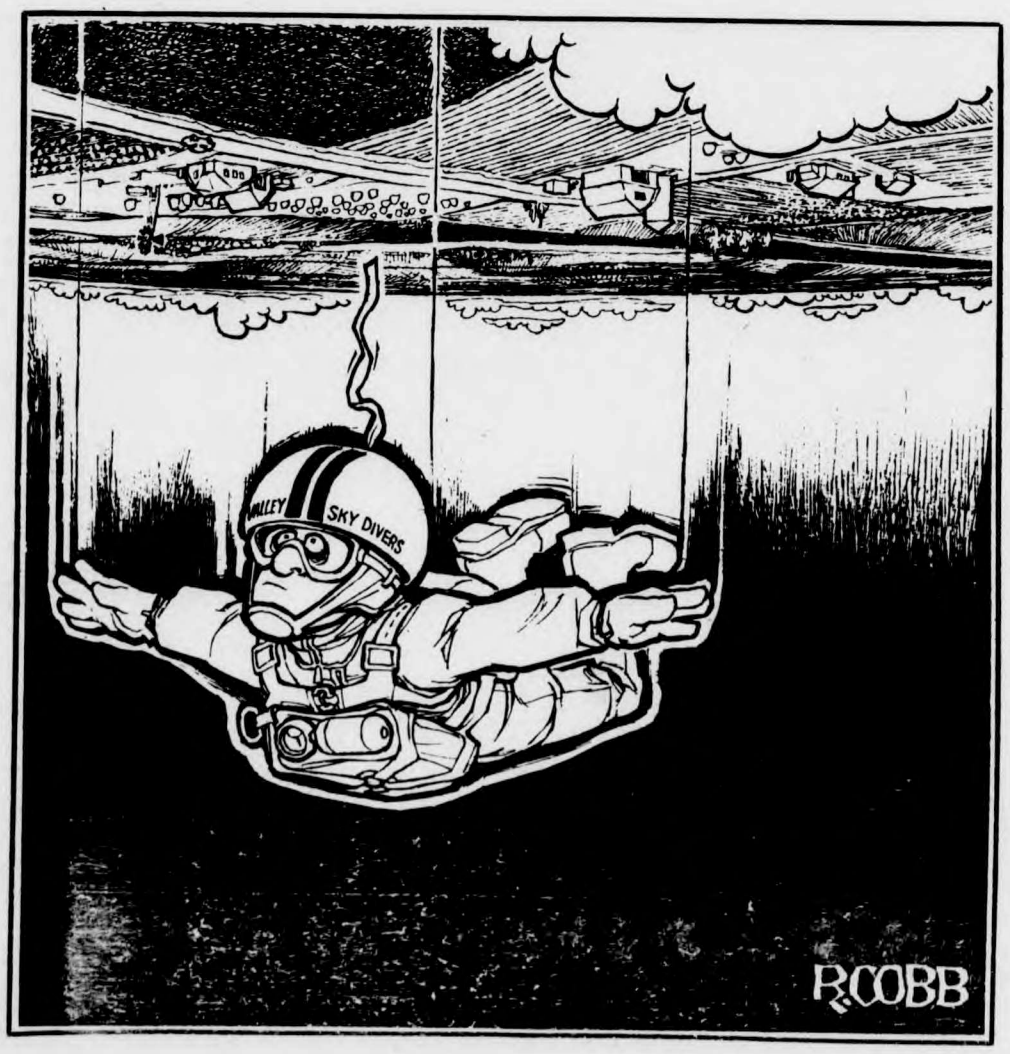
Because the airplane travels over the speed of sound it does not only break the sound barrier but creates a shock wave which travels along the ground with the aircraft. This is the sonic boom and may vary from a roll of distant thunder to a blast which shatters windows and plaster. ($500,000 damage was done in Ottawa in 1959 from the intense boom created by an F-104 flying at supersonic speed over the Uplands Airport terminal.) The SST will cruise at a high altitude and the water vapour and smoke from its engines may cause heavy pollution of the upper atmosphere. Another difficulty is located in the engines which together have a thrust equal to four Boeing 707's. The noise levels from SST traffic may, as a result, increase to an even more unbearable level.

Most information about the SST is uncertain and speculative relying mostly on experience with military airplanes, some scientific research and tests of the British-French Concord supersonic aircraft which started flying in 1970. (A Russian entry, the Tu-144, began testing in early 1969 but is remaining mysterious.) Many feel that there is enough to go on — or not to go on — to justify condemnation of the SST though President Nixon, the Boeing Company and the British and French governments uphold the project of building a fleet of these aircraft as being beneficial in the long run.

The focus of attention of the opposition is on the environmental effects of a large number of SST's and the safety of travelling in them; here are the details of the issues involved.

The speed of sound at sea level is about 760 m.p.h. and the leading edge of an airplane wing travelling below this speed easily pushes air molecules aside and allows them to flow back together after the wing has passed by. However if the wing is moving faster than the speed of sound or supersonically the air molecules cannot move aside fast enough and there is extreme compression and heating and a shockwave spreads out in the form of a cone from the aircraft. This conical shockwave (which has a horizontal axis) travels as fast as the airplane and remains as long as it is flying faster than sound. This cone of compressed air molecules eventually reaches the ground where it is heard as a sonic boom and, depending on its pressure, produces anything from vibration to heavy damage. Its strength varies with the size of the aircraft, its speed and altitude and also with weather conditions on the ground.

The Boeing 2702-300 SST will weigh about 375 tons, be 298 feet long with a wingspan of 143 feet and is expected to produce a shockwave of from 2 to 2.5 pounds per square foot (psf) over normal air pressure. It is hard to imagine what this means but tests were made over Oklahoma City in 1964 when military jets flew over the city at supersonic speed a total of 1,254 times. The average shockwave pressure they made each time was 1.3 psf. Out of a population of 324,253, 15,452 persons complained during the tests and $123,000 was awarded for damages produced by the sonic booms. The shockwave may be reduced by weather conditions on the ground but may also be amplified a number of times to produce especially harmful shocks of 4 psf or more. The Concord SST was flown over the west coast of Britain in late 1970 with little damage produced but with continuous flights of a fleet of 500 commercial airliners there may be more cause for alarm. Apart from structural damage there is the obvious nerve fraying effect of unexpected and repeated sonic booms on people and animals beneath SST flightpaths anywhere on the surface of the earth. The booms, even if not strong, may disturb sleep, work and leisure by causing what psychologists call startle reactions; involuntary responses to a loud noise. Some proponents of the SST programme maintain that we may adjust, but at what cost?



At present the planners assure that the aircraft will not fly supersonically over populated areas so that the sonic booms will be restricted to the oceans and "wastelands". Many ecologists are concerned about the effects of constant booming on wildlife and the Canadian Arctic will be one of the potential corridor areas. There is also the chance that once the supersonic fleet is established and growing there will be strong pressure to allow faster-than-sound flights over inhabited areas to increase profits and allow competition with slower aircraft which produce no boom and are permitted to fly overland.

The Boeing Corporation claims that landing and takeoff noise levels from their SST's engines will be lower than that of the 707. On the surface this seems true; approaching the runway 1 mile out the 707 produces PNdb (perceived noise in decibels) while the SST will produce 108 PNdb. However the area this sound level covers will be larger. On take off the 707 produces a noise level on the ground of over 100 PNdb extending 2,000 feet on either side of the runway when the plane is 200 feet in the air. The SST will extend this area to about 6,000 feet on either side. An area 4 miles long and 2 miles wide would receive at least 100 PNdb noise levels on takeoff and landing. (For comparison a trailer truck at highway speed has an over-all sound level of about 90 db at 20 feet.) On the ground the sideline noise or noise to either side of the aircraft may reach 124 PNdb and extend for nearly a mile. (Because the decibel scale is a ratio system, every 3 db increase in sound level means a doubling of intensity. So 124 db is about three times the sound intensity of 108 db and about 10 times the intensity of 90 db.) The intensity and penetration of engine noise from the SST would make large areas around airports very difficult to live in though it has been suggested that they could be rezoned for industry or recreation. The landing of the British-French Concord at Heathrow airport in September 1970 caused a storm of protest and the Department of Airports in Los Angeles has banned SST's from landing in that city. A new airport in Toronto would have to be located far outside of the city and would make a large area of land very unpleasantly noisy for humans and other living things.

The Concord will have a cruising altitude of about 55,000 feet and the Boeing SST of 65,000 feet. At this height (in the stratosphere) substances may remain from 4 months to several years before being mixed with air from lower altitudes, and many scientists are concerned that the gases and smoke from a large fleet high flying airliners will cause pollution of the upper atmosphere with harmful consequences to the climate of the earth. Aircraft account for much less overall pollution than automobiles and while this is being reduced even more through research a large amount of smoke particles, water vapour (up to 150,000 tons per day from a 500 plane fleet) and CO_2 will be injected into the stratosphere. The action of the water vapour, which may form clouds, and smoke particles would be to reduce the amount of sunlight reaching the earth's surface, thus reducing temperatures. CO_2 may act to hold more heat radiation in the atmosphere causing higher temperatures. Such materials could concentrate over heavily travelled routes like the North Atlantic and alter the climate beneath. These effects may, as Boeing maintains, not be strong enough to worry about or may balance out in the long run but little is known and the influence of a fleet of these aircraft tearing around the upper atmosphere is difficult to predict.

The Boeing SST will carry 200 tons of kerosine fuel and will burn about 1 ton per minute of this on takeoff and about ½ a ton per minute while cruising. According to one pollution handbook's "Doomsday Chart" we are in danger of running out of oil deposits as early as 1990 and the amount of fuel burned by 500 SST's would no doubt hasten this resource depletion. This consideration in itself indicates that the use of these aircraft would be unwise and even if ignored may one day leave us with hundreds of streamlined flying machines parked on runways around the world with no fuel in their tanks. When resources start to get more scarce they would be the first to be cut off.

Much of the impetus and justification for the SST comes from the economics of the project and the fact that we are locked into a socio-economic system whose values and demands call for ever faster and more efficient transportation. One can criticize the system and its latest technological outgrowth, the SST, as a whole but there are also some difficulties with the SST which originate from within the existing framework to counter the justifying arguments.

Many assert that a fleet of supersonic aircraft will be needed to handle the increased amount of air traffic of the future. An average rate of increase of 11 to 13 per cent if predicted up to 1980 and while more large aircraft of the 747 jumbo jet type can be produced there will be growing problems with crowding of airlanes and airports. These jets may be larger in size but still travel below the speed of sound. The Boeing supersonic aircraft not only will seat 298 but will also travel over twice as