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planes

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AIA CONFERENCE STRENGTHENS LATIN TIES



LATIN AMERICAN AVIATION CONFERENCE, sponsored by the Export Committee of the Aircraft Industries Association at the Bal Harbour Hotel, Miami Beach, Fla., recently was the first ever held. Discussions were held on such mutual problems as financing, procurement and availability of aircraft and equipment. Both Latin American and U.S. leaders termed the conference a success. Shown at the conference are (left to right): Major General Truman H. Landon, Commander of the Caribbean Air Command, Admiral DeWitt C. Ramsey (USN-Ret.), Vice Chairman, Board of Governors, Aircraft Industries Association, Mundy I. Peale, President, Republic Aviation Corp., and Honorary Chairman of the AIA Export Committee, General Anibal Solminihac, Chief of Staff of the Chilean Air Force, Charles Shuff, Westinghouse Electric International Corp., Chairman of the Export Committee.

Aviation Export Problems Aired

By Mundy I. Peale
President, Republic Aviation Corp.,
Honorary Chairman, AIA Export
Committee

The premise of international trade is as simple as a housewife's transaction at a supermarket: One party wants to buy; the other wants to sell.

But this simple premise quickly gives way to a complicated and often frustrating pattern when the hard realities of export and import take over.

The high purpose of the Latin American Aviation Conference sponsored by the Export Committee of the Aircraft Industries Association, in Miami Beach, Fla., was to explore and define mutual problems and then to set about solving them. This conference, the first of its type ever held, is important simply because it was held.

The conference afforded a forum for civil and military aviation leaders from 19 Latin American republics to meet with the U.S. aircraft industry representatives, U.S. Air Force, civil agencies of the federal government concerned with aviation, and present their problems and recommendations. The Latin American delegates to the conference were articulate and, more important, frank spokesmen in presenting their opinions and desires.

Robert E. Smith, general manager of the Costa Rican Airline, LACSA, set the keynote of the conference on the opening day.

"Our first problem is financial," he told the conference. "We are going to have to renew our domestic and international air fleets at a cost several times our combined net worth. . . . We can and will attract new investment capital in each of the countries without necessarily increasing government ownership. However, we cannot expect to meet all our capital demands with equity issues. We must obtain financial credit from aircraft suppliers and such credit agencies as the Export-Import Bank and the World Bank, two great institutions who have done so much for Latin America and the rest of the world, and the most logical collaborators with suppliers and buyers of aircraft equipment in the future needs of Latin American

(See MEETING, Page 7)

'Water Squeezer' Halts Jet Aircraft In 300 Feet Without Damage

Engineers have developed a novel "water squeezer" for halting high-speed jet planes in less than 300 feet, without damage to aircraft or landing gear. The device, which absorbs the energy of the landing aircraft, is expected to be delivered to military services in the near future.

The "water squeezer" operates as follows: As the jet plane lands, it engages with a hook one of two cables stretched across the runway. The cable is attached to a piston in a water-filled pipe. As the engaged plane rolls forward along the landing strip, it pulls the piston through the water, absorbing the airplane's energy and thus bringing the aircraft to a halt.

Called an "expeditionary arresting gear" because it can be easily and quickly dismantled and moved to forward areas by helicopter or cargo transport plane, the new device can be swiftly set up on fields with runways as short as 1,000 feet, making them suitable for landing modern, high-speed jet aircraft.

No adjustment of the arresting gear is necessary for different landing weights or landing speeds. Ex-

periments are currently under way looking toward eventual adaptation of the device for use as safety barriers at commercial and military airports.

The "water squeezer" is also being used at a western Air Force base to halt a high-speed test sled which in turn is used to test pilot ejection seats for military aircraft.

This development by the aircraft industry will save the substantial sums required to build longer runways needed to handle high-speed jet aircraft.

In still another novel development for testing aircraft arresting gears, engineers have built a four-jet-engined "hot rod" car which simulates high-speed jet aircraft landings.

The bright red "hot rod" will never interfere with auto traffic, nor give sleepless nights to the highway patrol, however, since it rides a steel "I" beam along a 5,000-foot track. Because of its four high-performance jet engines, the "hot rod" can attain the speed of a landing jet aircraft and at the same time push

(See JET, Page 8)

Nuclear Reactor Tests Effects of Irradiation On Aircraft Parts

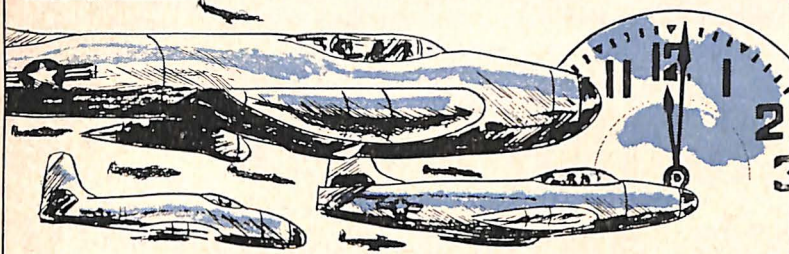
Work on nuclear-powered flight has reached the point where irradiation effects on aircraft parts and components are being tested in a nuclear reactor which simulates high altitude conditions.

Irradiation cells on two sides of the reactor will be equipped with environmental chambers capable of simulating high altitude conditions. With this arrangement, tests can be run to determine the behavior of materials and components under varying thermal and radioactive conditions which may be encountered in flight by types of aircraft now under consideration.

While expensive, such testing of aircraft parts, materials and components is vitally necessary because of the radically different nature of nuclear flight. Flight ranges will be imposed only by the amount of radiation materials that flight crews can safely absorb. Refueling will be almost non-existent as a problem. The nuclear-powered plane can stay aloft as long as its crew holds out, according to the best estimates of scientists and engineers working on the project.

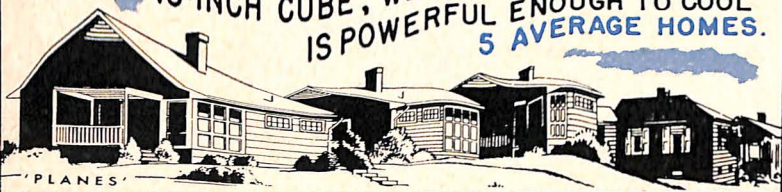
Plane Views

USAF HAS APPROXIMATELY 1,000 PLANES ALOFT EVERY MINUTE AROUND-
THE-CLOCK-- ON DEFENSE ALERT,
TRANSPORT, OR TRAINING MISSIONS.



OPERATIONAL COMMUNICATIONS FLOWING
BETWEEN CITY OFFICES OF ONE MAJOR U.S.
AIRLINE WOULD FILL THE PAGES OF 300
BOOK-LENGTH NOVELS EACH MONTH.

AN AIR CONDITIONER FOR
A NEW U.S. AIRCRAFT OCCUPIES AN
18-INCH CUBE, WEIGHS BUT 35 LBS., YET
IS POWERFUL ENOUGH TO COOL
5 AVERAGE HOMES.



Tin Cans Vital Part Of Wind Tunnel

Future supersonic aircraft and missiles will owe some of their high performance characteristics to tin cans—8 million of them.

The cans will be used in the air-storage section of a wind tunnel that tests models of planes and missiles. They will act as a radiator to keep the air temperature nearly constant during a test blow. The cans fill eight giant steel spheres, each 36 feet in diameter, which store 200,000 cubic feet of compressed air for operation of the tunnel. Without the cans the air temperature would drop about 200 degrees Fahrenheit during a test blow which would result in serious errors in test data.

Aircraft industry engineers hit upon the idea of using the tin cans—enough to fill 135 boxcars and weighing 1½ million pounds—which hold the temperature drop to 30 degrees.

The new wind tunnel, first of its kind, costs \$5 million and was designed, built and financed by an aircraft company. The single tunnel provides for research in the subsonic (less than the speed of sound), transonic (through the speed of sound), and supersonic (past the speed of sound) ranges. The investment in this valuable research tool insures the qualitative superiority of American air power.

PLANE FACTS

- To fly at Mach 2 (twice the speed of sound), a plane must be able to operate in a temperature of about 210 degrees—the temperature of boiling water. At Mach 3, temperature requirements go up to 500 degrees, and at Mach 4, the external surfaces of an aircraft must withstand a temperature (generated by air moving over the aircraft skin) of 1,000 degrees Fahrenheit.

- Of the employes of one large West coast aircraft manufacturer to complete ten years service with that company, 85 per cent are still on the payrolls. The company awarded its 10,000th ten-year service pin, in November, 1956.

- Domestic scheduled U. S. airlines carry three times as many men as women, according to the Civil Aeronautics Administration in Washington. And, the organization says, of the estimated 45,860,000 passengers travelling U. S. domestic and international airlines during 1956, between two and eight per cent were children.

PLANES

Planes is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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Safety on the Skyways

The record on accidents on the nation's city streets and highways can no longer be considered as a "rather alarming set of statistics that some careless drivers are running up." Indeed, the death rate on the nation's highways has reached incredibly tragic proportions. During 1956, the American Automobile Association estimates that upwards of 42,000 people were killed outright and that a staggering 1,350,000 were injured.

During the Christmas Holiday weekend alone, the death toll on the nation's highways reached an all-time high of 706. One week later another 409 persons met death on the highways instead of the new year.

So great has this shambles on the highways become, that city, state, and national government have seen fit to issue constant reminders by way of the press, radio and television urging great caution on the roads and highways.

Yet, through all of this, the nation's huge airline industry has carried upwards of 45,860,000 passengers more than 27,760,000,000 passenger miles with a fatality rate of only 0.62 per 100 million passenger miles in 1956 as against 0.76 in 1955. A passenger mile is one passenger flown one mile.

The Civil Aeronautics Administration, responsible for the compilation of these remarkable statistical facts on air travel safety, also pointed out (as a chart on page 8 of this issue indicates) that this nation's international air carriers flying more than 7,000,000 passengers over 117,000 miles of air routes have not experienced a fatality since March 1955—a perfect safety record for 21 months.

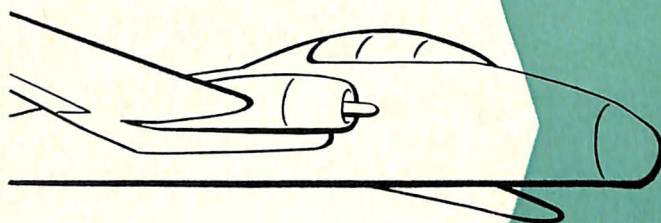
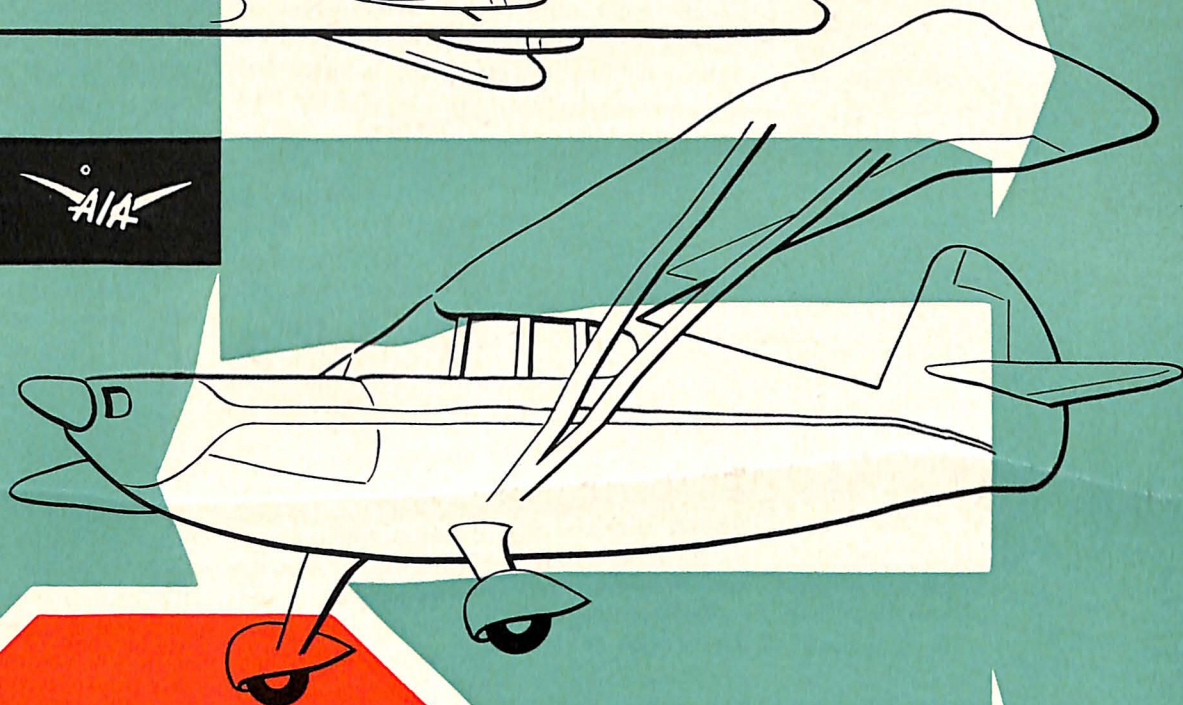
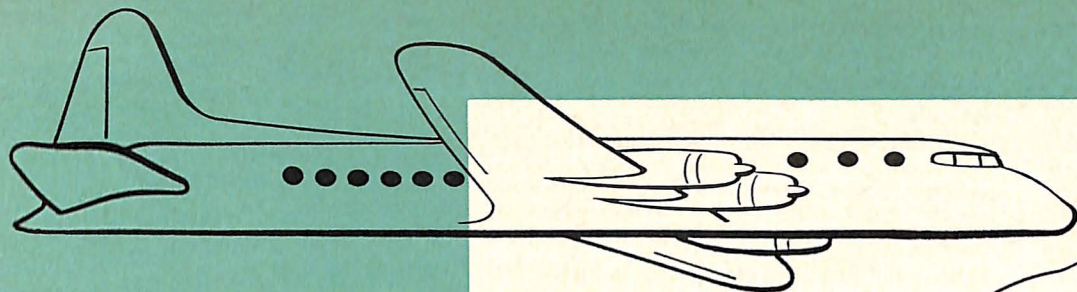
Providing safety for the air traveler is the prime objective of the airline operator, the aircraft industry and the government. In this regard, along with the airlines operations and maintenance personnel, the thousands of engineers in the aircraft industry are probably the most safety conscious. For, in the final analysis, it is the aircraft manufacturer and his team of engineers who are responsible for making the airliner one of the safest means of public transportation. By and large, their efforts are overlooked because the air traveler simply knows—and expects—that his safety "is being looked after."

Mechanical and technological advances in airline safety are not, for the most part, apparent to the passenger. They include a host of developments among the more notable of which are: automatic feathering and reversible pitch propellers, anti-skid braking, steerable nosewheel, high strength nylon cord tires, very high frequency communications, omni-range navigation, ground controlled approach instrument landing systems, thermal anti-icing systems, evolutionary improvement of engines, cockpit standardization, improved exterior lighting, fire detection and extinguishing systems, and many others.

There is little wonder then that more than 45 million safety-conscious, comfort and economy-wise travelers turned to the airways instead of the highways in 1956. Evidence of the trend in traveling taste is that nearly two-and-one-half times as many traveled by air in 1956 as traveled by air in 1950.

Your safety is on the skyways. This is the fact of the matter.

planes



SKYWAY

By Col. Roscoe Turner
(CAP—Aux. USAF)

COLONEL ROSCOE TURNER, pioneer



aviator and only three-time winner of the Thompson Trophy, is Chairman of the National Aeronautics Committee of the National

Security Commission of The American Legion. Col. Turner was awarded the Distinguished Flying Cross in 1952 by Act of Congress for his contributions to aviation development and pioneering in speed flying. This is the first such award made by Act of Congress in more than 20 years and one of only six such Distinguished Flying Crosses ever awarded by Congress. Col. Turner is closely associated with general aviation as a fixed base operator. He is president of the Roscoe Turner Aeronautical Corp., Indianapolis, Indiana.

GETTYSBURG, Pennsylvania, is a pleasant little town famed chiefly for an event in its past—the Battle of Gettysburg, which turned the tide in the Civil War.

Out at the Gettysburg Airport, however, an event takes place nearly every weekend, which in a way has the battlefield beaten hollow as a tourist attraction.

Tourists who have come from far and near to walk over the famous battlefields at Gettysburg are beginning to realize that it is worth their while to drop in at the airport on weekends for Gettysburg's other big attraction.

They sit in their cars, or stroll along the edge of the field, watching the horizon to the south. After a while, their patience is rewarded by the sight of a small, two-engined airplane which makes a brisk turn over the field, then sets neatly down and rolls toward a waiting limousine.

As the propellers come to a stop, the door swings open, and out steps Dwight D. Eisenhower, President of the United States—the

first President ever to hold a pilot's license, and the first President ever to fly in a plane with less than four engines.

Gettysburg's No. 1 citizen has returned to his farm for the weekend, and the tourists get a chance to wave and shout "Hi, Ike!" at him.

The fact that the President uses a small business plane for the 80-mile trip between Washington and Gettysburg is just one more indication that general aviation today is the rule out the slower and more cumbersome forms of locomotion.

The postwar growth of the airlines is a well-known story. The mighty upsurge of military aviation often makes front page news. But general aviation has also made amazing progress—progress which is not nearly so well known.

Today, general aviation—all civil flying except the scheduled and nonscheduled air-

lines—flies three times more hours every year than the airline fleets of the nation.

GENERAL aviation's fleet outnumbered the total number of airliners by at least forty times. Aircraft used for business purposes alone outnumbered the nation's fleet of airliners fifteen times.

During 1955 (the last year for which complete statistics are available), business aircraft flew an estimated 4,300,000 hours—a million more hours than were flown by all the domestic airlines.

Deliveries of new aircraft for general aviation—a significant yardstick in measuring the growth of general aviation—have been on the increase. In 1954, 3,073 new airplanes were delivered; in 1955, 4,434; and over 6,000 in 1956.

Today, general aviation itself is a major business, and one which, through its very nature, makes substantial contributions to the national economy and defense through speeding the transportation of materials, equipment, and key personnel.

Substantial contributions to the nation's agricultural economy are also realized through the utilization of general aviation. The Civil Aeronautics Administration and agronomists

portance of aircraft to the industrial economy lies in the fact that 90 of the nation's 100 largest corporations now operate one or more aircraft.

A recent CAA study estimates that general aviation will increase in scope by an average of 400,000 hours a year through 1960, which would raise annual flying hours for general aviation to 11,500,000 by that time. Many qualified spokesmen for industry feel, however, that this growth estimate by CAA errs on the side of caution.

General aviation has more multi-engined aircraft operating in airline-type IFR flying than the airlines, and large numbers of single-engined airplanes are adequately equipped for this type of flying. It is not unusual for a small business airplane to have a price tag on its instrumentation equal to one-third of its total cost.

Because of its lusty growth, general aviation is potentially, if not already, the largest user of the nation's "magic web" of interconnecting airways, and constitutes the largest civilian market for modern airborne communications and navigation equipment.

Business fliers are discovering that, in order to make the most efficient use of their air-

at the same time, traveling to and from the same destinations, and utilizing the same ground facilities. On the ground, the difference in size between a typical general aviation aircraft and a civilian transport or a military bomber seemingly makes the general aviation plane an insignificant gnat.

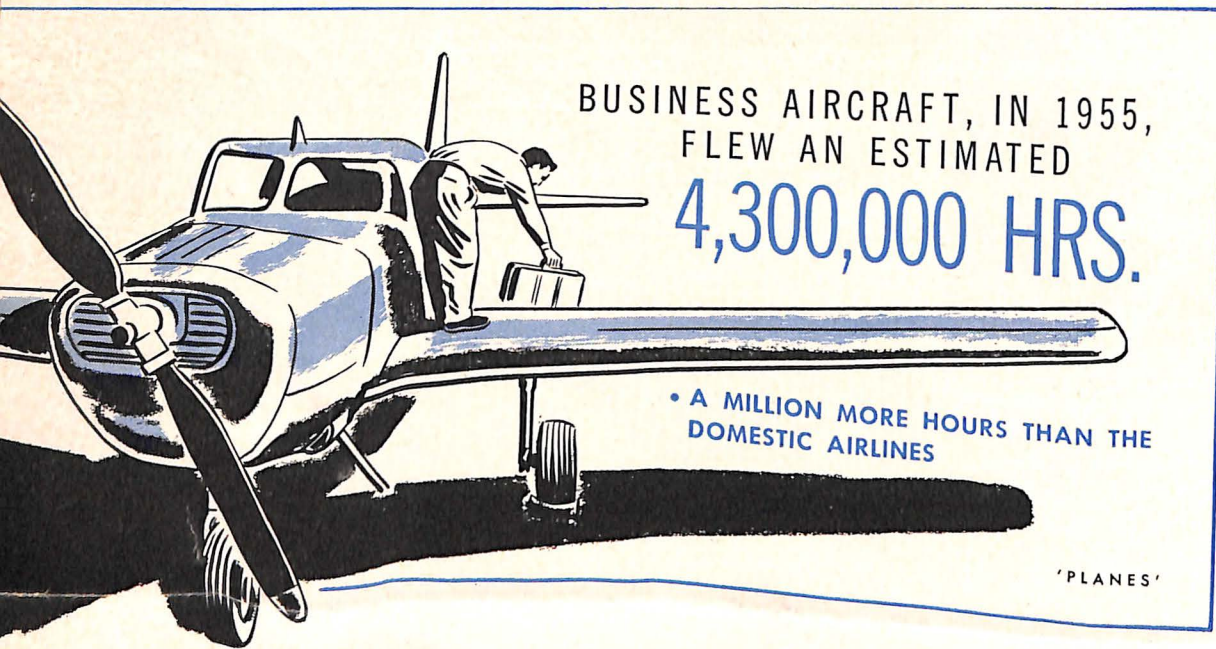
In the air, however, it is a very different story. Such differences in size or dimension shrink to nothingness, and all aircraft necessarily become equal as units moving through space.

Methods for sorting and controlling the burgeoning air traffic over America have lagged behind the rapid rate of increase in air transportation and aerodynamic progress. We are thus in danger of running out of "free air."

THERE is no ready-made solution to the problem, which is now recognized to be of great urgency and of national importance. President Eisenhower noted the magnitude of the problem when he said, in appointing Edward P. Curtis, an Eastman Kodak Company official, as his Special Assistant for Aviation Facilities Planning; "I am taking this action because the rapid technical advances in aviation and the remarkable growth in the use of air transportation have confronted the nation with a serious aviation facilities problem. Modern aircraft can be operated in the numbers required in the national defense and in the civilian economy only if airports, navigation aids, air traffic control devices, and communications systems are suitable for their needs."

The President went on to say that to delay formulation of a plan to solve this growing problem "is to invite further congestion of the air space, needless hazard, economic loss, inconvenience to users, and possible impairment of the national security."

The progressive growth of general aviation is endangered by the problems enumerated by the President—airways congestion, crowded control zones, insufficient airports, and inadequate communication and navigation aids. Piled on top of these are still another set of circumstances which bode ill for the future—general aviation has been virtually a stepchild in the thinking of key government planners, mainly because the needs and desires of the civilian transport carriers and those of



of the Department of Agriculture have estimated that the use of aircraft by farmers and ranchers, both as efficient transportation and as a valuable agricultural tool in chemical dusting and spraying, has added approximately \$3,000,000,000 a year to farm income.

In spite of these facts, general aviation today is woefully misunderstood by the general public and by some military, airline, and key government aviation planners.

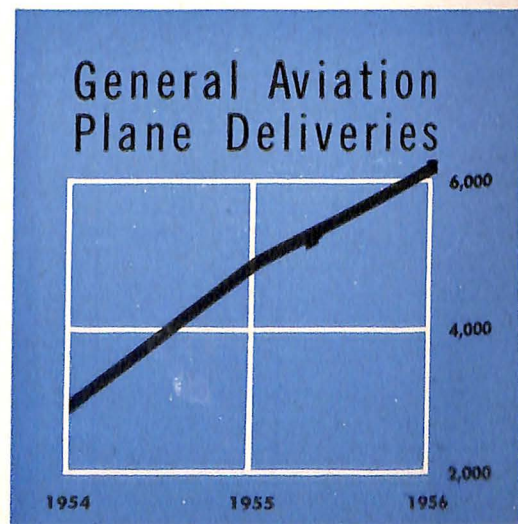
GENERAL aviation is not, despite the picture in the popular mind, solely for pleasure or sport. Actually, less than 22 per cent of general aviation flight time is occupied in pleasure or sport flying, according to current CAA statistical data.

The active fleet of aircraft used primarily for business purposes is now estimated to exceed 20,000 planes, and a measure of the im-

craft, they must be equipped with radio, instruments, and electronic navigating aids. All aircraft regularly engaged in cross-country flying have two-way radio installations which enable their pilots to maintain communications with air traffic controllers. More and more planes in the business fleet are being equipped with these devices. Already the business fleet has more auto-pilot installations than the nation's airlines.

ALTHOUGH we live on the bottom of an ocean of air seemingly so vast that it has no limits, the amazing fact is that we are already running out of room. The skies are fast becoming filled with all kinds of aircraft—military, airline, and general—and there is a definite need for some kind of cloud-borne traffic cops.

These planes occupy the same air space



military aviation are better known and are thus considered paramount.

One method of helping to solve this "aerial logjam" is the establishment of numerous small airports. This would not only relieve congestion at the country's larger airports, but would also serve to open up whole new areas to the air age. Even at this late date, there are large areas of the United States, both rural and urban, which are inaccessible by air. In fact, it has been estimated that only one-third of the continental United States is air accessible today. The airlines make only about 625 localities accessible for air travel. Yet, there are at least 15,000 incorporated urban areas in this country.

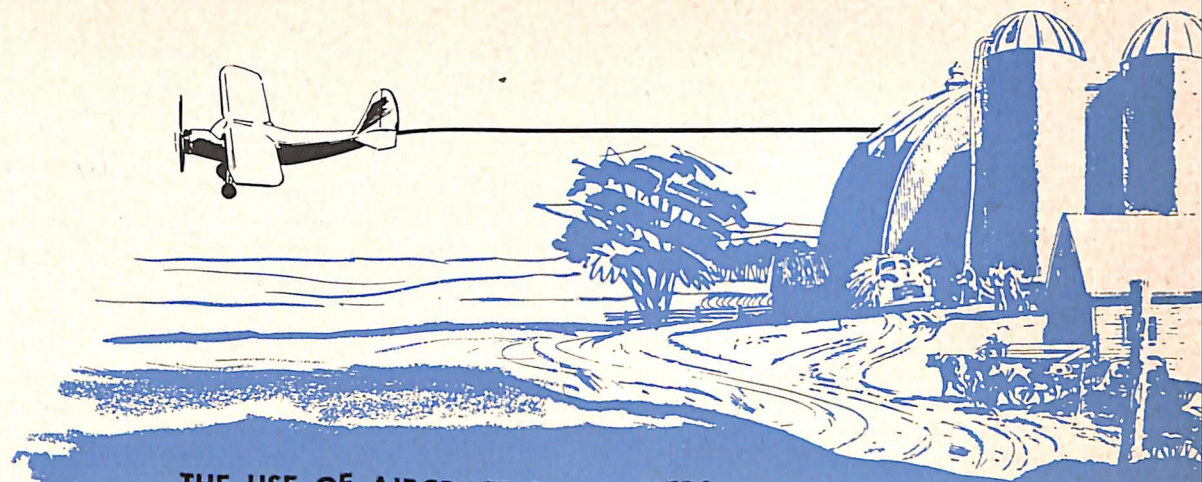
NOT every community needs a complete airport, of course. There are many built-up areas, particularly in the East, where one airport can and does serve several communities. There are also areas in which an airport could not be economically justified by the business it would engender.

But there are thousands of locations where a new and inexpensive complex of aerial flight strips would reap a generous harvest for the future not only of aviation but for the general economic good of the nation.

It would, for example, cost very little to construct single flight strips, about 2,000 feet long and 150 feet wide, laid out in the direction of the prevailing wind, with a surface level and firm enough to handle small aircraft. Such airstrips could be air marked and, where necessary, fenced off from adjoining fields.

Such a landing strip system could easily become part of the new multi-billion-dollar federal highway building program. By doing the two jobs—modernizing the highways and the landing facilities of the nation—at the same time, great economies would result.

The type of road-building machinery used in highway construction is identical to that used in airport building. Because such machinery would already be in use adjacent to the proposed flight strip locations, the cost would be greatly reduced. Similarly, in land acquisition programs incident to acquiring highway rights-of-way, it would be possible at the same time to acquire the small additional amounts of land needed for flight strips at small additional cost.



THE USE OF AIRCRAFT BY FARMERS AND RANCHERS HAS ADDED \$3,000,000,000 YEARLY TO THEIR INCOME

If these flight strips were laid out alongside the new interconnecting network of federal highways, the increased safety factor alone would more than justify their cost. Establishment of these landing strips would mean that a useful landing facility would always be near at hand. This would prove a boon, not only for general aviation, but for the airlines as well, which could, under emergency conditions, safely land a medium-sized transport on one of the flight strips.

FLIGHT strips would also prove of incalculable value for Civil Defense operations in time of emergency. With flight strips located alongside major highways, and near settled portions of the country, both large and small communities, as well as villages and hamlets, every part of America would be accessible by air, even if road and railway facilities were destroyed or jammed by enemy action.

Similarly, such flight strips would immeasurably ease the loss of life which occurs durably ease the loss of life which occurs during such natural catastrophes as earthquakes, fires or floods by enabling relief agencies to rush blood plasma, doctors, medicines, food and clothing to the disaster scene.

Until a system of flight strip airports is built, airport congestion will grow worse instead of better, because general aviation is definitely on the upswing. One of the most

incisive statements on the growth of general aviation was voiced recently by Henry W. Boggess, President of the National Business Aircraft Association.

"Thanks to the airplane," said Mr. Boggess, "a change akin to revolution has taken place in American business methods. . . . Prior to World War II, most industries in this country operated what might be loosely termed 'centralized organizations.' There has been a transition to 'decentralized operations' which has been more extensive and more rapid than seems to be generally realized.

"This trend to decentralization has quite naturally caused demands for faster means of travel. No longer is the businessman content to spend three or four days traveling in order to do one or two days of productive work. He has learned that he can use the airplane and double—often quadruple—his productivity."

HUNDREDS of key executives agree heartily. In case after case, businessmen have reported that the purchase and use of an airplane—or even a fleet of airplanes—has tremendously increased productivity.

In a typical statement, the president of a midwestern engine component and accessories manufacturing firm reported: "We have been operating our own airplanes for about 25 years, through all of which time we have considered them essential machine-tools to our business. We feel the cost of airplane operation is justified on several counts, among which we include the conservation of the energies and time of our key personnel; the tremendous advantage to them of being independent of public transportation schedules, which improve their efficiency of serving the customers and our company. It also makes it possible for these people to spend more time at home and still do their job, which is a real 'fringe benefit.'

"We are able to go efficiently to places not served efficiently by public transportation. And emergency shipment of products and parts is not an uncommon occurrence."

The businessman who is considering aviation as a useful tool in his occupation would



9 OUT OF 10 OF THE NATION'S LARGEST CORPORATIONS NOW OPERATE ONE OR MORE AIRCRAFT

do well to take up the matter with the commercial air service, or "fixed base" operator in his locality.

The fixed base operator, himself a businessman, not only understands aviation from A to Z, but understands the problems and special needs of business as well.

FIXED base operators operate air taxi services, conduct aerial dusting and spraying operations, train pilots, handle maintenance, overhaul and repair of aircraft, conduct aerial photographing, advertising and patrol assignments from customers, and, importantly, act as sales representatives for aircraft, engines, accessories, and equipment.

Many businessmen-pilots have become aviation enthusiasts through casual contact with a fixed base operator. There are instances of manufacturers whose assembly lines were threatened with a closedown for want of special parts or because certain tools had broken. When they learned they could charter a plane, fly to Detroit, or Milwaukee, or Birmingham, or Los Angeles for repairs and have their factories humming before nightfall, they began to appreciate the wonders of the air age.

Another group of businessmen—well-paid businessmen, at that—don't need to be sold on the merits of flying for their cross-country operations. This would be the Brooklyn Dodgers, or the "Bums," as they are lovingly called by the citizens of Flatbush. The Dodgers recently purchased a 44-passenger executive transport for transporting the baseball team to out-of-town games. The plane will also be used to transport three Dodger farm clubs in Montreal, St. Paul, and Fort Worth, according to Dodger president Walter O'Malley.

In addition to its use as a means of executive transport, the airplane is daily adding to its utility as a tool of industry in many other ways. Aircraft are being used to patrol power and pipelines, to make geophysical explorations, for aerial mapping and survey, to ride herd as "aerial cowboys," for dusting, seeding, spraying and fertilizing crops, and for directing automobile traffic from the air.

One of the more unusual applications of the

aircraft is its use by daily newspapers as an adjunct to the typewriter and the camera. A publisher in South Dakota, who purchased a plane to cover his 18-county circulation area, reported that "It will cost no more than the seven cents a mile now paid to employees for the use of their autos. If the airplane replaces more miles than that per week, it will cost less than automobile mileage to gather news by airplane."

A New York City daily scored a major news beat over its competitors by rushing its photographers out to sea in one of its airplanes to cover the sinking of the *Andrea Doria* when it collided with the Swedish liner *Stockholm*.

THERE have been other noteworthy uses of aircraft by newspapers, including rescue operations, flights of rare serum to persons suffering from snake bite, and airlifting supplies of food and medicine to families marooned by ice and snow.

The Colorado State Game and Fish Commission uses a light plane for transporting beavers. To keep the beaver population of the state balanced, two pairs of beavers are taken from crowded areas, flown to a sparsely settled area, and dropped by parachute. The plane door is removed, and the boxed beavers are released at between 300 and 300 feet in the air, depending on the terrain. The chute opens automatically by static line, and the box springs open when it hits the ground.

The record books also carry many cases of business fliers who took up aviation on doctor's orders. Usually, these were men whose jobs necessitated covering large territories. And their physicians told them that driving such long distances was too great a strain. Since purchasing aircraft, each has reported feeling more relaxed, accomplishing more work, and being able to spend more time at home.

There is apparently no limit to the potential uses of general aviation aircraft. One New Jersey auto dealer who uses a utility plane in his business was quick to take advantage of the fact that the car he was selling

featured a "variable pitch" transmission. By taking prospective car buyers up in his plane and demonstrating to them exactly what "variable pitch" meant, he doubled his sales over the previous year. Incidentally, he also did a great service for general aviation, by familiarizing his auto-minded customers with the benefits of the air age.

The State of Utah discovered that by far the best method of extraditing criminals was by air. By transporting prisoners in a State-owned light plane, Utah officials learned they save on meals and hotel accommodations formerly furnished to criminals in the process of extradition. Then, too, according to a Utah State pilot, prisoners are a lot less likely to attempt escape "with all that thin air between them and the ground. They think a lot more of their skin than to try jumping out."

Besides its application as a useful tool of business, industry, and agriculture, the general aviation aircraft also serves as a fascinating means of recreation. Flying for the sheer fun of flying is a pastime that is hard to beat. Also, vacationing by plane means more time for recreation at the vacation spot chosen, and less time consumed in getting there.

Almost invariably, business aircraft owners report using their planes for family vacations and week-end hops to nearby resort areas. In many parts of the country, there are "fly-in" meetings of various aviation clubs, which afford further recreational facilities to flying businessmen.

ONE of the most unusual vacation jaunts on record was undertaken last summer by Peter Gluckmann in his single-engine high-wing monoplane, "City of San Francisco."

Taking off from San Francisco, he flew 25,000 miles to New York, London, Geneva, Rome, Athens, Tel Aviv, Cairo, Bengazi, Tripoli, Algiers, Dakar, Freetown, Natal, Recife, Belem, Georgetown, Port-of-Spain, San Juan, Miami, and back to San Francisco.

The whole trip consumed seven weeks, and 198 flying hours. It was accomplished with the aid of complete instrumentation, a case full of maps and documents, extra fuel tanks, and one engine checkup. Gluckmann crossed the North Atlantic and South Atlantic oceans and the Mediterranean and Caribbean seas, and touched five continents—North America, Europe, Asia, Africa, and South America.

Back in 1927, when a young man named Charles A. Lindbergh made a solo flight across the Atlantic in a single-engined plane, the whole world went slightly crazy—and rightly so, since it was the first successful non-stop Transatlantic solo flight.

Gluckmann's flight, however, caused almost no stir in the newspapers, despite the fact that he, too, flew solo in a single-engined plane, and despite the fact that Gluckmann traveled a good bit farther than the famed "Lone Eagle."

If Gluckmann's flight proved anything, it proved that, at long last, general aviation has come of age, and is now safe and dependable transportation.



Meeting Stimulates New Proposal For Inter-American Cooperation

(Continued from Page 1)

airlines for long-term, large-scale purchases."

But Mr. Smith pointed out that it is against the present policy of the World Bank to make aviation loans. He also noted that U.S. insurance companies have extended long term credit to U.S. carriers which have exceeded the present net worth of the airlines. "Chattel mortgages in proper proportions should be enough on new equipment, because not only have original costs been continuously sustained in market prices, and will continue to do so in the foreseeable future, but the newest aircraft are demonstrably money earners and self-amortizing with adequate credit terms," Mr. Smith said.

Dollar Shortages

The arrangement of adequate credit is obviously the hinge that swings the sales of American aircraft and equipment abroad. The preference for American-built aircraft is overwhelming. Only the knotty problem of dollar shortages hinders the acceleration of trade with our Latin American neighbors.

This is a mutual problem involving the manufacturer, the customer and government and commercial credit institutions. The aircraft manufacturer today is not able to handle the financing of new aircraft. The aircraft manufacturer's ratio of profit to sales is well below the all-industry average. And the aircraft builder must re-invest a substantial portion of these marginal earnings in research and development to keep pace with his competitors in a rapidly advancing industry.

But the prospects of better credit arrangements are bright. Mr. Smith struck squarely at one solution with his opinion on chattel mortgages. The considerable size of the financing involved sometimes puts the risk involved out of proportion. The risk in financing new aircraft equipment is small when we look back over the pattern of earnings that the aircraft has made possible.

Bank Viewpoint

This is not dewy-eyed optimism. Alfred M. Vinton, of the First National City Bank of New York, stated: "As the earning capacity of Latin American countries increases, the overall picture should be definitely more encouraging. Certainly the United States will be increasingly dependent on the food and industrial raw materials of Latin America. To help meet this demand an ever increasing foreign investment in Latin America will be required. Capital funds will unquestionably be provided to fill the need as restrictions already eliminated, or in the process of elimination, in many countries are gradually and completely removed. As this development of Latin America's vast resources, accompanied by a net outflow of capital from the United States to this area occurs, the problem of dollar availability may not exist as we know it today."

Mr. Vinton, of course, is taking a long-range view of the economic relations between the United States and Latin America. But the Latin American Aviation Conference has already inspired plans to hasten the development of new credit sources and to liberalize the present credit arrangements.

The conference also produced some original thinking on an organization to handle inter-American aviation problems and to pursue mutual goals. Without commenting directly on the specific merits of a proposal made by Lt. Col. Carlos Uribe Uribe, Colombian Air Attache in Washington, to form an Organization of Inter-American Cooperation for Aviation, I would like to endorse the general idea of such an agency. Equally important is the fact that the conference engendered the thought shown in Col. Uribe's plan.

There is no question that we should hold future conferences of this type. Certainly we will be able to act more decisively and be able to come up with concrete proposals aimed at solving the problems we face. We have laid the basis for a progressive program in international trade.

Tunnels Simulate Speed Spectrum

Three new blowdown wind tunnels have been installed in the high speed laboratory of the research department of a leading aircraft corporation, capable of simulating air speeds from Mach 0.5 to Mach 10.

Operating in the transonic, supersonic and hypersonic ranges, the new wind tunnels are expected to produce invaluable results in knowledge of the conditions which will have to be dealt with in future flying. Three separate tunnels were built since each speed range has its own series of problems.

Research conducted in the hypersonic tunnel will be devoted initially to "thermal barrier" problems arising from the heat generated at high speeds and altitudes. The other tunnels will be used primarily on problems concerning design of inlets and exhausts of jet turbine and other ad-

Piece Of String Still Plays Vital Role In Era Of Supersonic Flight

In this day of supersonic fighters, automatic flight controls, guided missiles, rockets and mighty jet engines, a little piece of string still does the same important job for today's pilots that it did for plane pilots fifty years ago.

Fifty-three years ago, Orville and Wilbur Wright tied a piece of string to their plane so that they could tell at a glance, when their plane was airborne, whether their flight was steady. If the string fluttered in the windstream at a 90-degree angle from the strut to which it was tied, they knew their direction was true.

vanced type engines. All three tunnels can also be used to test airplane and missile models.

The "blowdown" design of the three tunnels stores air under high pressure and discharges it in short bursts for test runs. In this manner, some 75,000 horsepower are made available to the tunnels with compact, economical equipment.

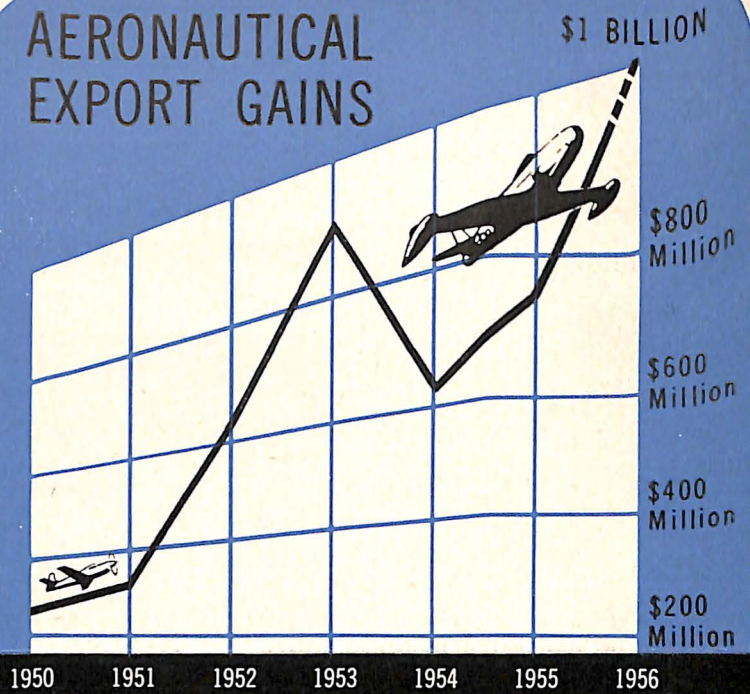
The transonic tunnel operates through the speed range from Mach 0.5 to Mach 1.5; the supersonic tunnel covers the Mach range from 1.5 to 5; and the hypersonic tunnel operating from Mach 5 to Mach 10 will permit conducting experiments at speeds the equivalent of between 3,800 to 7,600 miles per hour at sea level. Planning for the new tunnels has been under way for several years, and actual construction began in 1955.

By the same token, they could tell the angle of their plane in flight.

So it is today, in the era of supersonic fighters—a little piece of string still performs the same function for Air Defense fighters streaking across the skies. Air Force officers explain that the string still tells the pilot at a glance the amount and direction of "yaw" in supersonic flight.

And, they add with a grin, when America's great aircraft industry develops the first manned space-going craft, Wright's old "yaw string" will still probably be able to tell the pilots a thing or two.

AERONAUTICAL EXPORT GAINS



Exports of U. S.-manufactured aeronautical products have increased nearly five-fold since 1950 and for the first time reached the \$1 billion mark during 1956. The wide and constantly growing acceptability of American aircraft, engines and related equipment is due to their efficiency, reliability and economy of operation. U. S.-manufactured aeronautical equipment today is used in nearly every country in the world.

'PLANES'

Giant Telescopic Tracker Follows Missiles Flight Up to 300 Miles Away

The Army has a new giant telescopic tracker which can follow the flight of missiles as far as 300 miles away and show them on a screen in natural color. Designed to operate in conjunction with radar tracking apparatus, the new telescope, which weighs a ton and a half, simultaneously takes color and black and white photographs of rockets, jets and other flying objects automatically.

The tracking device can be controlled from a remote location, the Army reports, permitting it to be placed in danger areas to record the impact of rockets and other missiles. Differences between two varieties of objects moving at the same time within its range can be clearly shown.

Currently undergoing tests at a military proving ground location, the new instrument will be used to track and photograph high altitude meteorological balloons for their location and altitude, to locate objects such as rockets and artillery shells, and to evaluate radar systems.

The tracking device is equipped with a 400-pound lens of 160-inch focal length.

A whole new family of vacuum tubes for the electronic systems of supersonic aircraft have been developed to operate in temperatures above 932° Fahrenheit.

'Fingerprint' Test Used on Metals

The aircraft industry has borrowed from the techniques of the physician and the detective—X-rays and fingerprints—to insure the safety of metals used in aircraft and missiles.

The "fingerprint" technique works this way: First, a small piece of the metal is mounted in plastic to form a mold about the diameter of a quarter, and an inch high. The top of the specimen is ground and polished with a paste containing diamond dust to a mirror-like finish. The surface of a metal is similar to a fingerprint in that both the surface and cross section of the metal are excellent means of identification. The metallurgist produces a "fingerprint" on the polished metal by etching it in a special bath. The bath mixture dissolves different ingredients in the metal at different rates which produces a shallow "fingerprint" of hills and valleys.

Special microscopes with built-in cameras are used to view and photograph the pattern. In some cases, these patterns are magnified 100,000 times. This degree of magnification would make a pin point the size of a room wall. From this and other tests the metallurgist is able to deduce the methods and procedures used in the manufacture of the metal to insure that it meets rigid specifications.

The X-ray machine is used to detect subsurface voids, cracks and other defects. X-ray diffraction equipment enables the metallurgist to determine the rays reflected from the crystal faces of the metal. Different metal crystals have their reflecting faces tilted at different angles. These angles, patterns and frequencies have been catalogued for numerous metallic chemical elements, compounds and metallic phases.

These two reliable techniques of metal testing means that aircraft will have longer life, greater payload, lower operating costs and require less maintenance.

Jet 'Hot Rod' Is Used In Gear Testing

(Continued from Page 1)

a load comparable to the weight of a twin-engine bomber.

The jet engines, with a combined thrust of 28,000 pounds, are started by a remote control panel. Temperatures, revolutions per minute and fuel flow are checked on the control panel, and when the readings are right, the "hot rod" is started down the track by a switch which also breaks the control lines away from the panel.

Once on its way down the 5,000-foot track, the "hot rod" is on its own, with self-contained fuel and electrical systems feeding and controlling the engines. As the car nears the end of the track, it automatically trips a trigger cutting the engines, a widened section of "T" beam stops the car, and the dead load, pushed ahead on a platform, hurtles into the arresting gear being tested.

INTERNATIONAL AIR TRAVEL



In the two-year period, January 1955 to January 1957, U. S. scheduled international airlines flew 7,292,000 passengers (equal to the combined population of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma) between 90 foreign points. These experienced airlines flew more than 9,492,488,000 passenger miles over 117,000 miles of air routes with a fatality rate of only .02 per 100 million passenger miles. Travel aboard U. S.-built aircraft, the nation's international air travellers know, is not only the fastest, most luxurious and economical way to travel—but the safest!

'PLANES'

Expensive New Metals Necessary To Improve Aircraft Performance

Although titanium is the fourth most plentiful structural material on earth, it is in the critical cost class—about \$20 per pound in sheet form—because of its limited use. It has been available to aircraft designers only in recent years.

Assemblies requiring the use of titanium are presently being built into two of the Air Force's supersonic fighters, and additional contracts in the near future will call for an even greater use of titanium.

Aluminum whose base price is 35 cents a pound, long has been a standby in the aircraft industry. And the base price for 18-8 stainless steel sheets ranges from 73 to 87 cents a pound. Compare these figures with \$20 a pound for commonly used thicknesses of titanium alloy sheet. The difference is enough to increase the price of an engine by \$35,000 to \$50,000 when titanium parts are substituted for steel parts.

Since the day of the atomic engine is not too far away, this type of power plant will present special problems. Among some of the materials presently considered for nuclear-powered engines are lithium, \$11.50 a pound; reactor grade zirconium, \$23 a pound, and beryllium, \$71.50 a pound in unfabricated form.

As you ponder these figures, however, and watch the modern airplanes streak across the sky, bear in mind that their efficiency as weapons has been increased even more than their speed and cost.

The value of titanium lies in its strength—comparable to that of stainless steel—yet weighing only 56 per cent as much. The metal is corrosion resistant, and its superior strength-to-weight ratio at temperatures in the 800-degree range makes it of prime importance to modern high speed aircraft.

Besides its high cost, titanium is

also a delicate metal to work. Scratches and nicks can render a sheet of titanium worthless, since these can cause failure in forming. The costliness of titanium quickly becomes apparent from these figures:

A three-foot by ten-foot sheet of titanium, only .025 inches thick, costs \$351.

A tailcone assembly for a supersonic jet fighter is only 32 inches by 92 inches before forming, but is valued at \$307.

When the thickness of titanium sheet goes up one-eighth of an inch, as it does on the windshield frame of another supersonic fighter, its cost soars to \$58.60 per square foot.

Because of its princely price and delicacy, titanium is handled with kid gloves by aircraft manufacturers. Some airframe makers have set up titanium conservation committees which hold special instruction classes for employees handling titanium.

Electronic Brain Is Utilized to Select Sites for Viewing Earth Satellite

A new electronic "brain" which can make 1,764,000 logical decisions a minute, as well as performing 504,000 additions, 75,000 multiplications or 33,000 divisions per minute, is now being asked to select the sites from which the earth-circling "Project Vanguard" satellite will be tracked, with an eye to the viewing weather at each site.

The "brain" is the largest yet to be put to work on weather problems and is located at Asheville, N. C., at the National Weather Records Center, a joint operation of the Air Force, Navy and the U. S. Weather Bureau. It will be employed by the Air Force's Air Weather Service in

'Piggyback' Technique Used to Carry Spare Jet Engine on Transports

A novel design arrangement has been worked out by the makers of a new jet transport to carry a spare jet engine "piggyback" fashion. In response to a query from nine customer airlines, the manufacturer is designing an engine-carrying pod under the starboard wing of the jet transport, which would be faired into the wing as much as possible to reduce drag.

Ordinarily, the "piggyback refill" engine would not be used for the airplane which carried it, but would be a means of sending a spare engine to another jet airliner held up at one of its stops by engine trouble.

In its present configuration, the jet liner cannot take a spare engine into its cargo hold because of the size of the access doors. But with the new design feature, it will be possible for one jetliner to tuck a spare power plant under its wing and take off to help another with engine trouble, without the necessity of stockpiling spare engines at every stop along the route—another example of cost reduction by the aircraft industry.

climatological studies for the nation's military defense. Air Force meteorologists will be able to draw on the vast stores of data maintained in the Asheville weather records center to solve many intricate military weather problems, both hypothetical and actual. When a particular military weather problem arises for a certain locale, a quick rundown on the electronic "brain" will provide a detailed analysis of it swiftly.

By providing a single continuous system for processing weather data, the machine will perform in one operation computations that previously took 42 separate steps.