

the by-pass, for medium long-range hops, and the conventional jet for long-range duty. The piston engine used almost exclusively in today's commercial airplane engines is presumably on its way out as the dominant power plant.

The by-pass engine, predicted for medium long-range flights, is now in the experimental stage, but experts believe that the revolutionary power plant shows great promise.

The only commercial by-pass engine in advanced development stage today is the Rolls Royce Conway of Great Britain, but almost nothing has been released about its performance. It is proposed as the power plant for the VC-7, a British airplane now being developed.

For improved economy at medium-high altitudes and high speeds, the by-pass engine draws more air into the intake than is ordinarily used for burning jet fuel. The excess air is routed around the combustion chamber into the exhaust. The by-passing air slows down the exhaust gases, making the engine more efficient for airplane speeds greater than can be obtained economically in a turboprop, but slower than top jet efficiency.

### Efficiencies Compared

The ideal by-pass range is from 500 to 600 miles an hour, precisely the speeds at which airlines are now aiming.

Efficiency of propeller driven planes, such as the turboprop, is best at low speeds, then drops to nearly zero near the speed of sound. Jet efficiency increases directly with speed and shows best performance beyond the sound barrier. The by-pass engine's peak efficiency lies somewhere between the two types. It offers fuel economies of from five percent to ten percent over the jet and is quieter.

For shorter hops, the turboprop engine seems most promising. It offers greater speed than comparable planes driven by piston engines, and has less rumble and engine noise.

In the turboprop field, the 44-passenger 320-mile-an-hour Vickers Viscount has a considerable lead, and its successful use by European and Canadian airlines has spurred development of other turboprop models.

### Turboprops Planned

There is also the Bristol Britannia, now being tested in Britain, which should be available next year. The Dutch have developed the Fokker F-27 which is smaller than the Viscount.

In the United States, the Lockheed Electra turboprop liner has been ordered by American Airlines, apparently in answer to Capital's new Viscount fleet. The Electra will probably be powered by four Allison 501 engines. Latest data set the Electra's speed at 414 miles an hour at 25,000 feet with 80,000 pounds. It will carry 64 to 80 passengers and should be coming off the production line in 1958.

Noise is a major setback in the jet's use, the jet engine being one of the loudest ma-

chines yet devised by man. In the air, the engines would probably not bother passengers because at high-flight altitudes the air is thin and cabins will be well insulated.

At supersonic speeds, which are predicted in from 20 to 30 years, jet noise for passengers will be no problem, since the plane would travel faster than the sound it makes, leaving the noise behind it.

If you have ever heard a jet fly low over you, you can imagine what an annoyance such engines might be to persons at or near an airport. Jets idling on the runway would also kick up a mighty roar.

### Noise Reduction Schemes

Several recent schemes have been developed to reduce the noise problem. One is a portable screen that, when placed at the proper distance from the jet's exhaust cone, considerably reduces noise toward the roar.

Another proposal employs a collapsible sieve attachment for the engine exhaust. It changes the jet noise from a low roar to a squeal, much of which is of too high a pitch for human ears to catch. When the plane reaches cruising altitude, the sieve folds like a collapsible drinking cup, permitting full use of jet power. (See SNL, July 16, p. 39.)

Jets, as a rule, need longer runways than piston-engined planes, but most of the planes being designed could operate from many of today's modern fields safely.

Artificial control of airflow over the wings, called boundary layer control, is seen as the most promising way to shorten landing and take-off runs of future jets. One method employs blowers and suction.

### Fuel Consumption High

Fuel is also a problem, especially with the jet. The Super-Constellation, equipped with today's efficient piston engines, needs about 22,000 pounds or almost 4,000 gallons of gasoline to make a non-stop transatlantic flight.

Turboprops drink even more fuel, but of lower grade. By-passes burn even more, and the turbojet tops the list in fuel consumption rate. For this reason, transatlantic jets will have to be giants like the Douglas DC-8.

Airlines in the United States are now "getting scared" as one official in the Civil Aeronautics Administration put it. They fear that competition from abroad and importing of Viscounts by one airline will upset the present passenger balance. Airlines and aircraft manufacturers are now maneuvering for position as they enter the stretch in the jet race. Experts are betting heavily that the outcome will be widespread jet service on major airlines in the next ten years.

Beyond that time, only the most reckless will venture a guess. Perhaps rocket service—perhaps even atomic aircraft lie above the future's horizon.

Science News Letter, September 3, 1955

### METEOROLOGY

## Antarctic Blizzard Hits Weather Stations

► WEATHER OBSERVATION STATIONS in Antarctica have been destroyed by a blizzard, the director of the Australian Antarctic Division, P. G. Law, reported in Sydney, Australia.

The weather stations were automatic and required no attention, he said. They were valuable because they were placed more than ten miles from Mawson in Mac-Robertsonland, helping to give a broad picture of the Antarctic weather that could not be gained from one station alone.

Science News Letter, September 3, 1955

**SURPLUS TOOL BARGAINS**  
SAVE UP TO 50%

**41 SURPLUS TWIST DRILLS**

For hand or electric drills. Brand new genuine hardened carbon tool steel drills from 1/16" through 1/4". Each drill designed and tempered to give up to 1800 drillings through steel, aluminum, iron, wood, plastic. Sells in the stores for up to \$6. Set of 41 drills \$2.00.

**\$2**

**5 PLIER SET**

For jewelers, optical workers, hobbyists. These superb German instruments are of drop-forged, high-quality tool steel. All ground and smooth working joints with just right tension, jaws meet perfectly to safely and securely hold most delicate objects. Each plier is 4" long and a veritable gem of precision and strength.

**75¢ EACH** for **\$3.50** for COMBINATION

FLAT NOSE  
ROUND NOSE  
DIAGONAL  
SNIPER  
COMBINATION

Take The Work Out Of Using Screws With The Sensational

**Supreme POWER DRILL SCREWDRIVER ATTACHMENT**

Fits all Drills 1/4" and Larger

Clamp this new unit in your drill—just like a bit, and see how fast and easy it runs every screw up tight! Light, compact and fool-proof, this attachment is actually a screwdriver blade with a built-in clutch—the spinning drill chuck drives the screw only when you press with drill. Release your pressure, and the friction clutch releases the screw end. Changeable blades included for either slotted head or Phillips screw, with Allen wrench and complete instructions. For screws up to 3/16" (three sixteenths) diameter... only \$4.95. Also Heavier Duty model for screws to 1/4" diameter—only \$6.95.

**ORDER ON 10-DAY TRIAL GUARANTEE**  
All surplus and direct imports. Sold on money back guarantee. Send check or money order with name and address. We pay postage. If C.O.D. you pay postage and C.O.D. charges. Money back guarantee protects you fully.

**SCOTT-MITCHELL HOUSE, Inc.**  
Dept. 2409, 611 Broadway, N. Y. 12