

# Tale-Spin by Al Donman

## DONALD HOWARD ROGERS

CHIEF TEST PILOT DON ROGERS, ALTHOUGH A COMPARATIVELY YOUNG MAN, IS OLD IN FLYING EXPERIENCE, HAVING LOGGED AN IMPRESSIVE TOTAL OF MORE THAN 3,500 AIR HOURS. (THIS TOTAL, OF COURSE, INCREASES WEEK BY WEEK, AND IF IT TAKES THE USUAL LENGTH OF TIME TO "GET OUT" AVRO CANADA NEWS, DON'S TOTAL AIR HOURS, BY THE TIME YOU READ THIS, MIGHT EASILY RUN INTO FIVE FIGURES.) HIS INTEREST IN FLYING GOES BACK TO BEFORE 1935 WHEN HE OBTAINED HIS PRIVATE LICENSE AT THE HAMILTON FLYING CLUB. LATER, HE WAS A FLYING INSTRUCTOR AT THIS CLUB AND, STILL LATER, IN 1940, DON BECAME ASSISTANT CHIEF FLYING INSTRUCTOR AT NO 10 ELEMENTARY FLYING TRAINING SCHOOL AT MOUNT HOPE, ONTARIO. IN 1941 HE WAS APPOINTED ASSISTANT CHIEF TEST PILOT AT VICTORY AIRCRAFT AT MALTON, PREDECESSOR OF AVRO CANADA, AND IN 1943 HE WAS LOANED TO THE TEST DEPARTMENT OF THE R.A.F. TRANSPORT COMMAND TO GAIN EXPERIENCE ON MULTI-ENGINED AIRCRAFT. MOST OF HIS SERVICE WAS ON THE NORTH ATLANTIC FERRY AND HE MADE A NUMBER OF DELIVERY FLIGHTS TO THE UNITED KINGDOM. (THESE "DELIVERY" FLIGHTS TO THE U.K. WERE IN NO WAY CONNECTED TO THE INCREASED BIRTH RATE AT THAT TIME.) THIS GAVE DON AN OPPORTUNITY TO VISIT AVRO MANCHESTER WHERE HE GAINED EXPERIENCE ON LANCASTER TEST FLYING WITH J.H. ORRELL, AVRO MANCHESTER'S CHIEF TEST PILOT.

LET'S TRY THAT SLOW ROLL ONCE MORE!



GREAT TALKER! NEXT TIME YOUR WIFE IS "SOUNDING OFF" JUST CALL DON ROGERS



IN 1948 DON SPENT SOME TIME WITH THE ROYAL CANADIAN NAVY, FLYING "SEA-FURIES" BASED ON THE AIRCRAFT CARRIER "MAGNIFICENT" PREPARATORY TO TEST FLYING THESE AIRCRAFT WHICH WERE FORMERLY OVERHAULED AT AVRO CANADA. EARLY IN 1949 DON MADE A TRIP TO ENGLAND TO BECOME FAMILIAR WITH FLYING THE "TUDOR 8", AN EXPERIMENTAL FOUR-JET TRANSPORT. THIS WAS IN PREPARATION FOR THE FORTHCOMING TEST FLIGHTS OF THE AVRO JETLINER AT MALTON. DON'S LEISURE TIME (WE CAN HEAR YOU SAYING "WHAT LEISURE TIME....HE WORKS AT AVRO CANADA DOESN'T HE?") IS SPENT MOSTLY WITH HIS WIFE AND THREE HANDSOME YOUNGSTERS WHO RESIDE AT MALTON. ONE OF DON'S FAVORITE HOBBIES IS TO ADDRESS VARIOUS GROUPS AT VARIOUS TIMES AND GIVE LENGTHY TALKS ON VARIOUS SUBJECTS. A HOBBY OF THIS SORT WOULD ORDINARILY REQUIRE A GREAT DEAL OF ONE'S TIME....BUT NOT SO WITH DON ROGERS.... DON IS A SPONTANEOUS TALKER WHO ENJOYS TALKING AND IS ABLE TO TALK AT LENGTH WITH LITTLE OR NO PREPARATION. HE IS A MEMBER OF THE INSTITUTE OF THE AERONAUTICAL SCIENCES AND ALSO THE SOARING ASSOCIATION OF CANADA, IN BOTH OF WHICH DON TAKES A KEEN INTEREST. FOR THOSE OF YOU WHO MAY WISH TO KNOW DON'S AGE (PERSONALLY, WE CAN'T SEE WHAT POSSIBLE GOOD IT WOULD DO ANYONE TO KNOW DON'S AGE BUT WE HAVE TO FILL THIS SHEET SOMEHOW) HE WAS BORN IN 1916 IN HAMILTON, ONTARIO.

AVRO CANADA  
**N**ews  
APRIL 1951



JIM FLOYD WINS WRIGHT MEDAL



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## AVRO VIEWS

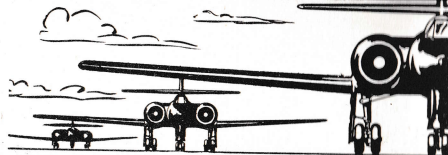
Without exception so far the reaction from outside readers to the magazine has been favorable whereas there has been little or no expressed plant reaction. We do not like this last situation and would much prefer a few brickbats, indicative at least of readership.

One reason perhaps for lack of plant reaction is our slogan that the best criticism is a contribution. There are only two or three people who regularly contribute to the magazine despite our search for voluntary contributors. (We occasionally get conscripted articles but usually it is easier to write them ourselves.)

If the magazine doesn't meet your desires, how about doing something about it, as Bette Nedelcoff, winner of this month's prize for the best contribution did. She didn't know what to do exactly but dropped around and together we got the idea for her article on house-building in the internal section.

## COVER

Popular Jim Floyd, chief design engineer for our transports, holds a model of the Jetliner. His paper on this aircraft to the society of Automotive Engineers has won for him the coveted Wright Brother's Medal. Jim, who is now a Canadian, is the first non-American to win this honor, the Nobel prize of aviation.



## PRODUCE FOR PEACE

Our trump in the present all-out struggle with the communists is that we can make better weapons faster. In numbers we are weaker but the effectiveness of such weapons as the Hell-bomb and CF-100 should make any country hesitate before attacking us. By accomplishing a high production of such weapons as these, we will make any attack on us foolhardy. (We know that under our present form of government we would not start a war ourselves).

We intend to arm ourselves without giving up our comparatively high standard of living, although we probably will have to give up some of the frills. Aircraft workers in the USSR have to work more than five times as long as we do to obtain the same needs. North America already provides its tremendous productive capacity by rescuing without overmuch sacrifice the United Kingdom and Europe from postwar economic disaster and probable communism. Now we have another challenge.

While some temporary controls will be necessary to channel very scarce materials to use for defence, our productive capacity would seem to be best improved by expansion rather than restriction. Much of the added defence work must come from increased efficiency and greater individual output on the part of such workers as ourselves.

By producing only a bit more than is normally asked of us we will not only improve our own living but ensure that our country is so strong that we will be permitted to continue making this living in peace and prosperity.

## TURBO-PROP or TURBO-JET?

by R Dixon Speas

AVRO CANADA REPRESENTATIVE IN THE UNITED STATES

Why will turbo-jets go into scheduled commercial service before turbo-props?

First, there is no such thing today as a turbo-prop power-plant with any service experience of consequence. All told, there is probably less than 250 hours of flight experience on turbo-props in North America on all turbo-prop installations combined. There are many problems which must be met by the turbo-prop over and above those which must be met by the turbo-jet, before commercial operation can be anticipated. As of today, turbo-prop operation must:

1. Await satisfactory solution of propeller stress problems. The propellers on the turbo-prop aircraft must be given almost continuous campaigns of detail inspection. Structural problems caused by aerodynamic and vibration loads still require a considerable amount of research and development before the propeller can be considered a fully developed aircraft accessory. The techniques of inspection involving special equipment as well as special procedures is also undergoing constant evolution.

The propeller inspection campaigns are expensive in more ways than the direct labor involved. Although extremely difficult of evaluation, the loss in aircraft utilization as well as the upset to normal maintenance procedures required by each of the propeller inspection campaigns has represented in the past, and can be expected to continue for the foreseeable future, an extremely important item in the maintenance of a propeller-driven aircraft.

2. A turbo-prop powered aircraft must necessarily compromise its interior layout by the propeller position. In the case of the turbo-jet aircraft, the interior layout can be arranged completely according to the interior stylist's design. The passenger cabin can start right at the very front immediately behind the cockpit and extend right on back into the tail area, with lavatories, buffet, cargo compartments, and other interior accessories being located as desired from an interior layout standpoint. In the case of a turbo-prop, passenger seats cannot be placed in line with the propeller arc, which reduces flexibility in interior layout.



3. The maintenance and overhaul expense of a turbo-prop can surely be expected to be higher than that of a turbo-jet aircraft. This cost increase goes beyond the mere labor and materials required for routine maintenance and overhaul. The indirect costs and effects of the propeller inspection campaigns, as previously mentioned also adds to the overall cost of operation.

4. The turbo-prop powered aircraft cannot be expected to be as comfortable from a noise or vibration standpoint as can a turbo-jet aircraft. A turbo-prop powerplant is merely a turbo-jet with the addition of propeller shaft, gearing, and propellers. It follows that additional vibration can be expected from the gearing and propeller. It also follows that propeller noise, which has always been a prominent feature in the noise inside a transport aircraft also will continue. At the same time it must be said that with the turbo-jet the exhaust has been more of a problem than with the turbo-prop. Developments in this field, however, indicate a considerable improvement in the very near future. At the same time, the rear areas which are affected are much

more readily adapted to accessories of the cabin such as lavatories, cargo space, and buffets than is the area in the propeller plane.

5. The cockpit operational procedures for a turbo-prop are considerably more complicated than those of a turbo-jet. It might more properly be said that a turbo-jet is even simpler insofar as cockpit operation is concerned than is a turbo-prop, for it is quite evident that both types are considerably simpler to operate than is a reciprocating engine. In both instances, it would appear that the airplane is easily a one-man airplane insofar as cockpit controls are concerned. One-man airplane in this instance is not meant to infer that there would be any less need for a co-pilot than is the case today, rather it is intended to indicate that the desire of operational safety analysts, namely, that any cockpit should be handled by one man with the co-pilot as a double checking safety factor, can be more easily attained in either the turbo-prop or the turbo-jet than with the reciprocating engine. Insofar as the maintenance of levers, controls and other related maintenance and operations items goes, a turbo-jet is much simpler than the turbo-prop.

The advantages of the turbo-prop over the turbo-jet are essentially lower fuel consumptions and shorter runway lengths requirements. As to the lower fuel consumption, it

is quite true that a turbo-prop requires less fuel per mile than a turbo-jet insofar as present-day development is concerned and comparing aircraft of equal capacity and range. This differential, however, is not as great as might be thought. The resulting fuel cost differentials even in those instances where the turbo-jet and reciprocating engine cost less per mile for fuel are surprisingly small, especially in consideration of the benefits of the turbo-jet engine both economically, operationally, and passenger service wise.

As to runway lengths, it can fairly be said that the Jetliner for example, can successfully operate from any airport in North America from which pressurized four-engined aircraft are operating today.

It is not the intent to conclude that there is no place for the turbo-prop aircraft. On the contrary, the fuel economy factor over and above the cost per mile is an extremely important item in at least two operations, namely, long range trans-oceanic flying, and freight operations; and, it can be expected that turbo-prop aircraft will find its application on these two operations. Technical development is an extremely difficult matter to forecast in the role of turbo-prop and turbo-jet for the future beyond the next several years and is in the hands of the engineers working on the respective problems.

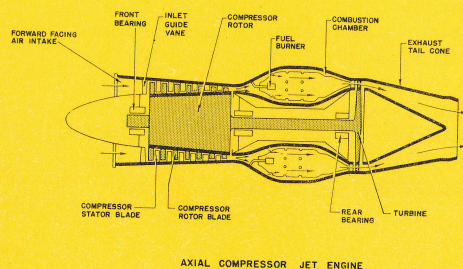
From consideration of the above factors, however, and

also considering the present state of development on the North American continent, I do feel quite strongly that the turbo-jet powered aircraft will go into commercial operation before the turbo-prop powered aircraft.

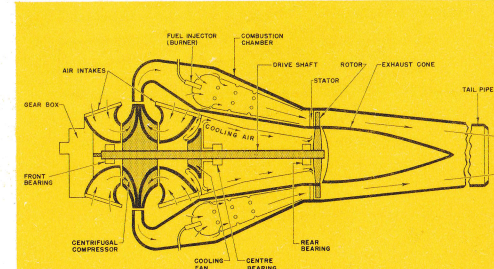
In this connection it is also important to study the basic turbine powerplant. As you know, such names as turbo-jet, gasoline turbine, and jet all refer to the gasoline turbine powerplant which now has a history of approximately ten years since it first successfully powered an aircraft.

In the so-called "centrifugal flow" turbo-jet, the initial compression stage is accomplished by means of a centrifugal-type blower similar to that normally used in a reciprocating engine. The first successful turbo-jet, as developed by Air Commodore Sir Frank Whittle, was of the centrifugal-flow type.

The second current type of turbo-jet engine is the so-called "axial flow" type wherein the initial compression is obtained through a series of turbine stages. After the initial turbine stage, both types of turbo-jet engines are similar in theory of operation and construction details. Once compressed, the air flows into a combustion



AXIAL COMPRESSOR JET ENGINE



CENTRIFUGAL COMPRESSOR JET ENGINE



chamber, or a number of combustion chambers simultaneously. There are two basic types of combustion chambers, "annular" and "multiple cylinder". Principles of operation of the two are similar. Different considerations of mechanical construction, efficiencies of burning, and temperature distribution have led to the two types.

Also flowing into the combustion chambers along with the pressurized air is a vaporized stream of fuel. The turbo-jet is not as choosy about its fuel as is the reciprocating engine. Kerosene or any one of several grades of gasoline as well as other liquids can be used. The economic advantage of kerosene over gasoline makes it a probable fuel in commercial service. The low flash point characteristic of kerosene, its resistance to ignition as compared with the more volatile gasoline, makes it a popular choice for commercial turbo-jet operation.

A sparkplug initially starts off the combustion, after which there is a continuous fire burning as long as the turbo-jet engine is in operation. In the

multiple cylinder, each chamber does not have its own spark plug. There are usually two or three distributed among all the cylinders (more than one is needed only as reserve coverage), and the combustion chambers are inter-connected so that once a fire starts in a particular chamber it immediately spreads to the others. In the instance of the annular chamber, the inter-connection is continuous. As the fuel and air burn, there is, of course, further compression of the gases, and as they expand, they rush rearward and exit through a single turbine stage. This turbine stage is an integral part of a shaft which connects it to the forward compressor, whether the forward compressor be axial flow or centrifugal-flow in type. As the exhaust gases turn over the exhaust turbine, it, in turn, motivates the centrifugal or axial-flow compressor, as the case may be.

The over-all thrust effect results in the "pulling in" of a large quantity of air and ejecting this same quantity of air, plus fuel, rearward at a greatly increased speed. The reaction from the ejection pushes the engine forward in accordance with primary law of physics, "for every action there is an equal and opposite reaction". This law is perhaps most clearly demonstrated by the man in a canoe who propels a mass of water rearward in order to drive his canoe forward. The turbo-jet propels a mass of air

CONTINUED ON PAGE 15



## The Yellow Menace

by Ted Colville

transmitter receiver with its batteries could be carried. Then its fresh air taxi atmosphere, while very pleasant during the summer, was conducive to pneumonia during colder weather. The gas buggy was also used normally by other departments in the plant and when a flight was contemplated, it had to be located and the radio set and batteries added before it was useable as a radio mobile car.

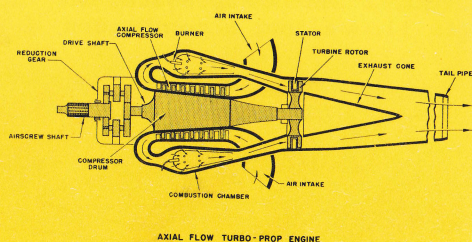
In the late fall of 1949, one of the company station wagons was converted to a radio car. While the station wagon was being overhauled, the equipment and facilities required were planned. The canvas roof was replaced with aluminum to act as a reflector for the necessary radio antennae and the car was painted a brilliant yellow and black. Then the radio equipment was installed on the left side of the car, replacing the middle seat. This equipment consists of a four channel V.H.F. transmitter receiver, tuneable V.H.F. receiver, two tuneable H.F. receivers and a public address system complete with speakers (on the roof), microphone and a record turntable. Three heavy duty storage batteries were installed to power the radio equipment along with a gasoline motor

The CF-100 fighter had been on one of its routine test flights and was coming in to land. Suddenly it pulled up in a typical CF-100 vertical climb.

The driver of a small yellow radio car on the side of the runway had noticed something wrong with the undercarriage which the test pilot did not know about. As the car is in constant radio contact with Avro Canada aircraft in the air, he quickly sent a warning to the CF-100.

Such incidents are rare for the operators of radio car VE9DF, popularly called the Yellow Menace, which normally is used from day to day only in routine work, useful enough in itself. But the operators are prepared for anything.

The original radio car was a small, inconspicuous gas buggy first used during the taxi testing and the first flights of the Jetliner. It communicated between the aircraft and the ground servicing crew, or between the ground crew and the plant when equipment or information was needed. This buggy was very useful during these trials but it had many limitations. The main drawback was that only one V.H.F. radio





generator unit under the hood to charge the batteries. Facilities were added at the front and rear seats to transmit and receive on the radio sets. This work was finished early in 1950 and the new Yellow Menace was driven out of the radio shop in time to be used during the taxi tests and first flights of the CF-100 fighter.

Since that time Avro Mobile VE9DF has been in constant use providing the necessary ground communication services for all aircraft being flight tested - the Jetliner, the CF-100, and all the various Lancaster conversions.

Jack Cudahy was the first driver of the original radio gas buggy and also later the new Yellow Menace. Since then Bob Wood, Lloyd Baker and at the present Steve Hall have been driver-radio-operators in succession.

The uses of the radio car are varied. The company frequency is set up so that constant radio contact is kept with any of our aircraft without the regular Malton Airport transmission being overloaded. The regular airport frequency is also monitored by the car so that existing traffic, weather, special instructions etc. are known and may be relayed to company personnel as required. Another feature is the car's ability to obtain clearance for the fire truck or other vehicles to travel on the airport runways when required. As a public address car, the mobile can be used for special occasions requiring presentation of speech-

es and recorded music. It is also used to relay instructions over the loudspeakers to ground crew on the airport.

While the mobile usually stays around Malton Airport, it has gone travelling on two occasions. It was driven to Montreal Airport when the Jetliner was conducting tests there and also to Ottawa when the Jetliner and the CF-100 fighter put on their official demonstration there. While the car was at Ottawa, the R.C.A.F. showed much interest and many photos were taken of its interior. Jack Cudahy who drove the car to Montreal and to Ottawa reports that while it handles well within the confines of an airport where speed is somewhat restricted, on a long trip the handling qualities leave something to be desired. The radio equipment necessarily installed on the left side causes the car to list to port and at speeds over 40 to wobble. On the trip to Montreal "Hopalong" Cudahy says he felt he was riding a bucking bronco. A suggested modification requested by Jack is the addition of a 20-quart oil tank for the car used 15 quarts to Montreal and back.

Merv Honsinger, formerly radio shop foreman, Irv Liss and John Pile of the Aircraft Design office planned the equipment and wiring used on the Avro Mobile. The technicians in the radio shop headed by Bob Wood also spent much time on the car, while installing the equipment and then working out the many bugs.



by *Bette Nedelcoff*

ART HARRIS PUTTING UP HIS OWN ROOF

In the past five years a surprising number of employees at Avro Canada have built their own homes. Labour and material costs as we well know, began to rise immediately after the war, and it seemed to these people that the only way to get something better than the cheaply-constructed houses springing up in identical rows all around Toronto, or, in some cases, to get any house at all was to contribute their own labour. Some of the boys, used to wrestling with technical problems, were able to draw their own plans. Their abilities as carpenters, block-layers, plumbers and electricians were often unproven, but many of those who could raise enough money to get started plunged into it, staking all their spare time and money, and hoping they would learn enough of the necessary skills as they went along. Many learned the hard way, but their individual savings have amounted to as much as \$3,000 or even more.

Because of the number of these home-builders throughout the plant we are going to res-

trict this article to those in the Airframe Engineering Department. One of the earliest of these pioneers was Jack Wilson, of Lines Loft, who built an insul-brick three bedroom bungalow in Port Credit away back in '44 and '45. Jack is still making improvements from time to time. Two other Loftsmen, Lorne Murphy and Sid Smith, built bungalows, Lorne's with asbestos shingle and Sid's with clapboard at Port Credit in '47, and Jimmie Guy, also from Loft, built his block-and-stucco one-and-one-half storey in North York in the same year. 1948 saw Roy Riseley working out in Scarborough on a one-and-one-half storey brick-veneer house with attached garage, and 'Stubby' Stubbington on a similar-sized insul-brick version just west of Highway 17.

In '49 the builders really got going. Ethel Hepton and her husband worked hard on their two bedroom brick bungalow at Cooksville. (Here a word of caution to the better halves of prospective builders). Ethel took on the job of lifting blocks,



and spent a week in bed with a sprained back, after lifting one too many. The Heptons moved into their house early in 1950, and are now working on their basement recreation room.

In the same year Lorne Berwick and George Emmerson built very neat two bedroom bungalows of almost the same plan and exterior appearance, except that Lorne's is frame with natural-stained clapboard siding and George's is grey brick with squeeze mortar. Both have garages attached by a breezeway and full basements. Howard Harvey built his one-and-one-half storey house in North York in eight months. It is unusually smart-appearing for this type, with clapboard siding, flat-roofed attached garage, three bedrooms, two bathrooms, and workshop and darkroom in the basement.

Tom Bush was one of the first to start building last year. He and Warren Lucas built under V.L.A. north-west of de Havilland. Tom chose a simple modern N.H.A. design with frame walls, shed roof and full basement. Simplicity of the design and hard work were probably the main reasons he was able to move in in October. Warren Lucas across the road from Tom, began a larger one-and-one-half storey N.H.A. design house with three bedrooms, which he estimates will cost him very little over \$6,000 to complete.

Not far from Lorne and Warren, Cliff Whiting was working on a small three bed-

room bungalow of his own design, with wide eaves and white clapboard siding, a large picture window looking out on a ravine, and a corner-fireplace with massive chimney. Cliff, wasting no opportunity, bought his lot the day before he became engaged, and his future wife pitched in and helped as soon as construction began. They were married in August. Cliff showed his determination by working on his house well into the cold weather after other builders had given up until spring.

Farther west Tom Batchelor was continuing work on his house. Being a part-time artist, he built his studio first, moving into it in '49. He designed a modern, flat-roofed basementless house with radiant heating which was connected to the studio by a breezeway. He built the breezeway in 1950 and intends to continue this year with the house, which will have a frame structure with stone exterior facing.

Just east of Malton Airport Ross Stuart was building



MRS. KEN ROWNTREE PITCHES IN TO HELP HER HUSBAND

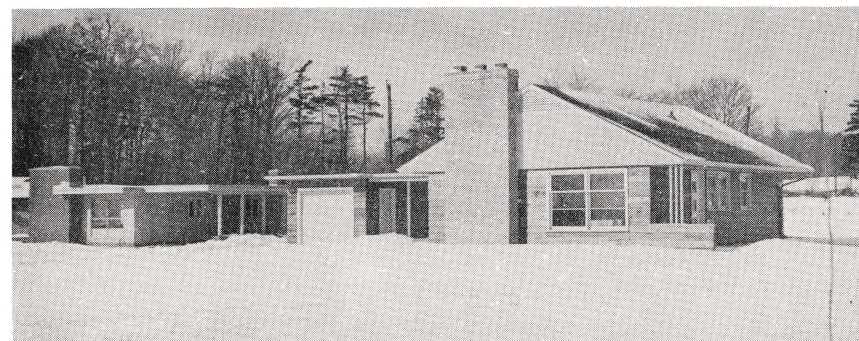
another modern shed-roofed, basementless house. Ross poured his foundation, using plywood forms and put in his own plumbing under the concrete floor slab. His heating system will be galvanized hot air ducts set in the concrete around the perimeter of the house, the air escaping up into the rooms through baseboard registers and finding its way back to the forced air furnace installed in a closet near the kitchen. Ross will have no opening windows, but will rely on ventilating louvers beside the fixed panes of glass. His walls are frame with vertical cedar siding and the chimney is prefabricated van-packer type costing only \$46. Interior walls will be mostly plywood.

Ken Barnes started rather late, but by employing a contractor to do a large part of the work, was able to move into his bungalow in Islington in October. Ken designed his house with red brick half-way up the exterior walls and naturally-finished pine above. With its

wide eaves, large living room window and chimney and low-slung appearance, it is one of the most attractive houses in the community.

Near Burnhamthorpe and Kipling on Winegrove Hill, Art Harris laboured over another bungalow of relatively modern design. The rear of Art's lot looks south over a ravine named Echo Valley and to take advantage of the sun and view he put the living room, with a large glass area, at the back of the house. A wide eave keeps out the summer sun and lets it in the winter. Art omitted a basement and is putting radiant heating piping in the concrete slab floor. The exterior walls are also of concrete, using sa-lo panels, 16 inch wide x 8 foot high pre-cast slabs bolted and cemented together. All windows are either fixed double glass or aluminum double-window units.

In Islington Heights, not far from Art, Al Galbraith built another smart-looking three bedroom bungalow. Al used



THE FINISHED PRODUCT: LORNE BERWICK'S NEW HOME WHICH HE MADE HIMSELF



perma-stone over the whole exterior wall surface and plywood panelling all over the interior walls.

In Brampton the Avro Canada boys have not been idle. As far back as 1947 Dan Cook was working on his N.H.A. prize-winning design which he built in brick veneer. Dan finds that building a house is a job that can go on for years and it was only last fall that he poured his basement floor and put in a warm-air blower.

Last year another Bramptonian, Ken Rowntree, began laying blocks for his three bedroom brick veneer bungalow. Ken first built an accurate model complete with furniture which he brought in and proudly exhibited to some of his friends. His wife, Maude, mixed most of his cement and helped with



The Private Jack Miles, of the Princess Pats, who received so much publicity for his courageous work as a stretcher-bearer in the heat of Korean action, is one of our employees who used to work in the Tabulating Department. Men who saw him on the battlefield said he seemed without fear, which is surprising to us because he seemed so reserved and rather shy. While he was working with us, he continued his studies, working towards the day when he could achieve his lifelong ambition of becoming a minister.

all the work. They worked right up to Christmas and got the frame walls and roof up. Like other builders, Ken is now looking forward to the warmer weather which will allow him to get going again.

One striking thing about these homes is that the vast majority are bungalows, many of them being three bedroom ones, even though the one-and-one-half storey house is generally conceded to be more economical to build for this amount of space. Evidently the extra convenience and lower, more "ranch-type" appearance is considered by the Avro Canada boys to be worth a few dollars more. Another interesting thing is that nearly all the builders would do one or more things differently if they were to build again.



IT'S ALL RIGHT TIDDLBY—I'M SETTING UP A DEPARTMENT BUDGET FOR NEXT YEAR AND THIS IS THE BEST SOURCE OF INFORMATION

Evelyn Newton, of the Public Relations Section, is looking for a salary decrease. Her last increase put her in a higher income tax group and she ended

up worse off than before her increase. However a recently-won scholarship for tuition in singing at the Toronto Conservatory of Music is helping cut down her expenses. She plans to leave us this summer to achieve a lifelong ambition, study at the Royal Academy of Music in London.

When asked what she would most like to have with her on a desert island, a movie star said she would definitely want to have the best obstetrician in the world. Failing that we nominate Ron Gibson, of the Parts Department, who when the doctor was a bit late, recently delivered his own baby. He was glad to see the doctor, though, later, as much for his as his wife's sake.

## RELATIVE-LY SPEAKING

*by Olive Wurm*

We apparently missed a few of the Avro Canada relatives in our recent summary. Here, for example, are some more from Material Control: Elta Lincoln, Material Records, and husband Fred, Tool Design and Planning; Norma Laramore, Material Records, and husband Tom, Training; Dian Curtis, Material Records, and husband Chic, Mill Supply Stores; Glenna Patch, Supply Division, and husband Del, Mill Supply Stores; Tom Rimmer, Material Records, and brother Ed, Lofting; brothers Gord and Doug Morrison, both in Production Stores; Jessie Abercrombie, Material Control, and daughter Helen, Production Stores; Charlie

Wurm, Gas Turbine Tool Room, and daughter Olive, Material Control; Frank Hems, Aircraft Inspection, and son Roy, Material Records; Eveline Small, Material Control, and husband Elwood, Mill Supply Stores; brothers Al Hocquard, Production Stores, and Ed, Mill Supply Stores; George Taylor, Mill Supply Stores, and brother Lorne, Tool Stores; Cliff Alexander, Production Stores, and son Gerald, Mill Supply Stores; Bob Faulds, Mill Supply Stores, and son Bill, Aircraft Planning; Lyle McNertney, Tool Stores, and brother Aubrey, Mill Supply Stores; Marg Dowson, Personnel Records, and husband Al; Bernice Fritzley, Tool Stores, and husband Dave, Gas Turbine Tool Room; Bert McCaffrey, Production Stores, and brother Bud, Maintenance; Mary Pilson, Gas Turbine Production, and husband Roger, Production Stores; Walter Coram, Mill Supply Stores, and son Gilbert, Mill Supply Stores; Charlie Lockhurst, Maintenance, and son Tommy, Tool Stores; Ruth Evans, Aircraft Design, and husband Al, Tool Stores.



HARRY HORAN, LEAD HAND IN THE GAS TURBINE EXPERIMENTAL BLADE SHOP, PROUDLY DISPLAYS HIS TWELVE CHILDREN, TWO OF WHOM ALSO WORK FOR US, JOHNNY, IN GENERAL MILLING AND MURIEL, IN MAILING



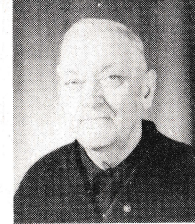
LONG SERVICE  
**AVRO CANADA**  
*Awards*  
 TO BE CONTINUED



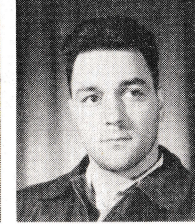
Neil McPhail  
Plant Security



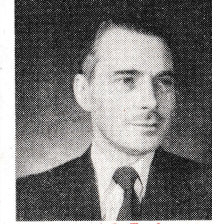
John R. Gane  
Aircraft Production



Frank Ackroyd  
Plant Engineering



John D. Simm  
Plant Engineering



Earl C. Busby  
Gas Turbine Production



Jas. M. McDonald  
Treasury Division



James Cherry  
Plant Engineering



David D. Wilson  
Supply



Z. S. Cyma  
Plant Engineer



Denis Harrison  
Aircraft Production



Walter A. Kohn  
Treasury Division



Chas. E. Falardeau  
Treasury Division



Albert Tee  
Aircraft Engineering



N.E. Butler  
Treasurer



E. K. Brownridge  
Gas Turbine Production



Ramsay Teeter  
Aircraft Production



W. N. Deisher  
Vice-Pres Gen Mgr



Arthur E. Keeping  
Aircraft Production



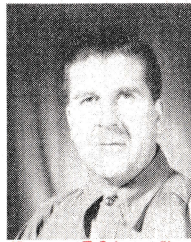
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S. L. H. Wilson  
Standards



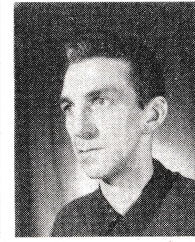
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John J. Haggerty  
Supply



Clinton Payie  
Plant Engineering



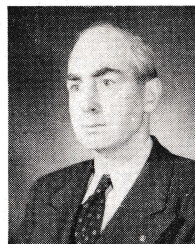
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Supply



Henry Shipley  
Aircraft Production



Ray Shippard  
Aircraft Production



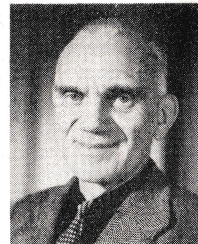
Gerald E. McManus  
Plant Engineering



L. E. Marchant  
Technical Assistant



M. Willer  
Sales and Service



Percival Francis  
Plant Engineering



Eleanor Davis  
Treasury Division



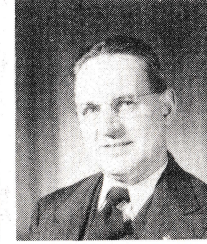
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Chief Test Pilot



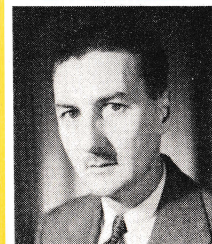
Leonard O. Thornquist  
Sales and Service



Harold F. Vigus  
Plant Engineering



James R. Tawse  
Aircraft Production



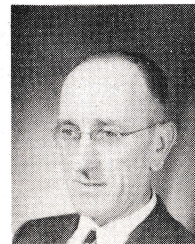
Philip Metcalf  
Gas Turbine Production



F. T. Smye  
Executive Vice-President



Jenavine Wright  
Industrial Relations



Walter Parrish  
Inspection



Lorne D. MacKenzie  
Plant Engineering



Mabel Plant  
Industrial Relations



Jack Ried  
Plant Engineering



Herbert A. Hale  
Plant Engineering



Geo. W. Veness  
Plant Engineering



Jacob A. Gaudaur  
Plant Security





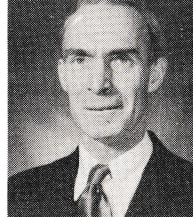
Regis A. Hanley  
Aircraft Production



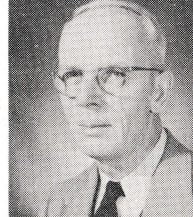
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Plant Engineering



Geo. Draper  
Aircraft Production



Murdock J. Gray  
Gas Turbine Production



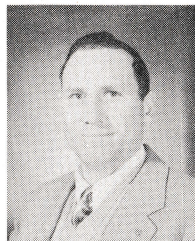
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Aircraft Engineering



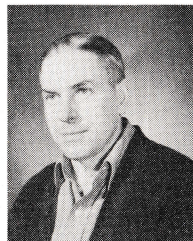
Leslie Southgate  
Aircraft Production



John J. Reynolds  
Aircraft Production



Donald Cryderman  
Aircraft Production



Michael L. Finegan  
Plant Engineering



James Rudyk  
Plant Engineering



Neil McDevitt  
Plant Engineering



Fred Finugan  
Gas Turbine Production



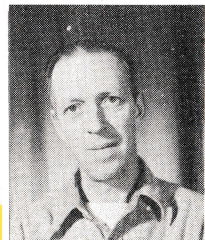
Charles N. Lucas  
Supply



Bryan S. Wood  
Aircraft Engineering



Mario A. Pesando  
Aircraft Engineering



Walter Harris  
Aircraft Production



Wilfred S. Farrant  
Gas Turbine Production



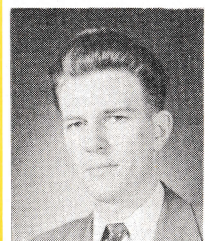
Harry McClintock  
Plant Engineering



Liwellyn A. Graham  
Plant Security



Lewis Clegg  
Gas Turbine Production



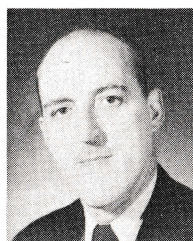
Wilfrid N. Farrance  
Aircraft Engineering



David Meldrum  
Sales and Service



Thomas Mitchell  
Plant Security



G. W. Harper  
Sales and Service



John O'Dell  
Plant Security



## THE AVRO CANADA *Boating Club*

*by Dick Smallman-Jew*

One day in the summer of '49, the two Bills (Shaw and Hancock) were sitting in the former's office at noon hour talking about boats and things, when they got the idea of going for a little trip one week-end. They then mused, 'If we go away to Georgian Bay, that paradise of boatmen, and enjoy ourselves, somebody else in this great company of ours might like to come with us' - so the idea was born.

A couple of weeks later, on a Friday evening, sixteen enthusiasts with six boats pulled out of Malton and drove north to Honey Harbour. Although the event was not publicized, it is only right that the skippers should be named - the two Bills, Eric Hall, Roy Nelder, Fred Parsons, and John Marshall.

On the Monday morning, it was obvious that something had been a success; sixteen fellows cannot keep a good thing a secret for long, and plans were solemnly made for a bigger and better 'do' next year. The 'do' was thereafter referred to as

'the Regatta', and so it is known now.

A second and third Regatta have since been held; June, 1950 found twenty-four boatmen with nine boats, and in September, the fishermen came too, making thirty-two 'men' and fourteen boats, and this year, 1951 - well, who knows?

Regatta day is usually heralded by the arrival in the car parks on the Friday morning of two or three cars with boats skilfully lashed on top - Bill Shaw and myself invariably giving the show away with our sailboats. The next clue is afforded by the larger than usual number of visitors who wend their way at lunch time to Bill Hancock's 'office' in the Loft. Conversation is distinctly nautical, and marked with reference to 'cases' (cases of food), bedrolls, tents, motors, gas, spares, etc. Zero hour is 4:45 P.M., when the sailboat-toting cars slip off in the direction of Brown's Line, other cars double round to the Hancock Boatyard in Malton, and within the hour



all are heading for Barrie, some with trailers, others with their craft on the car tops.

First stop is Duffy's at Barrie - Mr. Duffy provides very good hamburgers and coffee, and, of course, there is also Miss Duffy, she pours the coffee. After a short stop, the convoy presses on, and the lead man rolls to a stop at 'Nickersons' at Honey Harbour around 8:30 P.M., to be followed by the rest at short intervals. There follows a well-drilled exhibition of unloading - boats off, gear out, boats afloat, gear stowed, motors started, and the procession moves off up the darkening channel to No. 1 camp site on Beausoleil Island. The spare men and late comers with the heavy equipment usually charter a water taxi, and all are assembled by 11:00 P.M.

People can say what they like, but bacon never smells better than when mixed with the tang of wood smoke - it also never tastes better than when eaten in such goodly company.

Saturday morning at the camp site sees the arrival of the sailboats, which have been rigged and sailed up. They don't arrive, as a rule, until mid-day, and their presence is the signal for 'all present and correct' and 'all hands to cook-house'. After lunch, the crews reload boats and the fleet weighs anchor to move off farther up channel to Honey-moon Grove, which is No. 2 camp site, and on the edge of the open water. Speeds naturally vary, but to any onlooker,

the Avro Canada Boating Club is afloat and heading for its Rv on the northern tip of Beausoleil Island.

No words can describe the beauty of channel and bay, of rocky headland and tree-covered isle, or the blue of the sky and the clear tossing water, for Georgian Bay is unique, and those that gather there share a goodly fellowship and a common bond.

No-one can ever forget a sunset over the open water from the top of Honeymoon Grove; the gorgeous colouring is something no artist can truthfully portray.

As evening turns to night, the rocky slope of the Grove is still the scene of much activity - the activity which cannot be separated from camp life. Gradually it slackens and the group gathers around the camp fire for a song and a yarn, and below, the water laps the hulls of a dozen and more craft.

Sunday morning is generally given over to exploring, singly or in groups, speed trials, and generally 'horsing around' are also part of the fun until the afternoon when the Regatta takes place. The term Regatta is really a misnomer. True, all boats are afloat, and it is a grand excuse to do some 'formation flying' and for the power boats to chase the sailboats and themselves, and for our photographers to get really busy with 'action shots'.

By 4:00 P.M. everyone is ashore again. 'Pack up and Stow' is the order, and this also

means, 'Eat up anything tha's left'. By 5:00 P.M., the return trek has started; the sailboats with their slower speed are the first to leave, because we have five miles to go - the motors follow as each is loaded.

Back at Honey Harbour, it is 'Haul ashore, off sails, down mast, off with the motor, lash and stow on the car tops, and give a hand to anyone who wants one'. A parting word to Bill - a last look in a case - just in case, and with 'Cheers, fellahs', we are off home.

#### Appendix

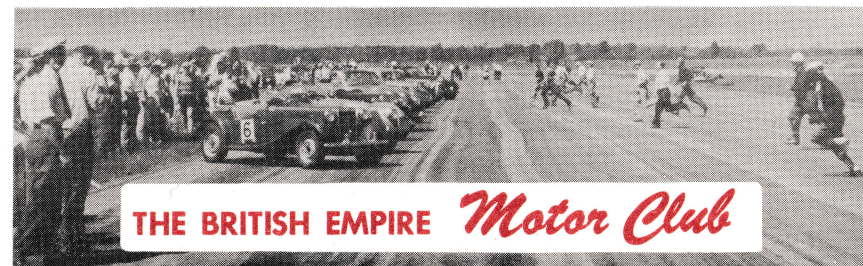
Two years ago, Bill Shaw designed his own boat, the Hancock Boat Works built it - it turned out to be a great success. Now he has designed another sailboat - for Dick Smallman-Tew - and it also is being built at the H.B.W. Now Lawrie Marchant has come up with an

altogether different craft - a catamaran of his own design, which is also being constructed by Bill Hancock, and all eyes are waiting for spring to see how it will perform. Hancock has also built himself the latest thing in small cruisers, which will be the flagship of the fleet.

While the Hancock Boat Works cannot accept any more orders for delivery in 1951, they have second-hand craft - both sail and outboard, in excellent condition, for disposal at very advantageous terms to members of the Avro Canada Boating Club. (Advt.)

Rumours, with more than a tang of truth, are that Frank Wood and Jim Flanagan have designed and propose to build a couple of very dark horses and - there may be a third.

Lastly, the Avro Canada Boating Club will have its own flag - burgees for the sailboats and pennants for the motors.



by Douglas Cramb CHAIRMAN OF CAR SECTION, B. E. M. C.

LE MANS START FOR SPORTS CAR GRAND PRIX AT EDENVALE

You have probably frequently seen small groups of Avro Canada personnel poring over magazines such as "The Motor", "Motor Cycling" and "The Autocar", (during lunch

hour, of course). In all probability these people are members of the British Empire Motor Club of Toronto. Several Avro Canada people have indeed distinguished themselves in this



club of motoring enthusiasts. Maurice Nix, Production Manager, Gas Turbine, is a polished motorcycle competition rider in cross-country trials, as are Bud Bailey and Ken Rolfe. Bud recently represented the B.E.M.C. in the gruelling International Six Day's trial in Wales and won a coveted "Gold Medal".

The club was formed in 1928, and has grown steadily until it is now the largest and most active body of motoring enthusiasts in Canada, promoting all manner of car and motorcycle competitive events. The club was formed originally as a motorcycle club but following the war the great influx of British cars into Canada prompted several of the members to form a car section of the club to cater to car enthusiasts. This group has organized many events along European lines including airport road races, driving skill tests, regularity trials, two-day rallies, timed circuit runs, speed hill climbs and night average speed judging runs. Meetings are held once a month throughout the year at which technical speakers give talks on automotive and associated matters and films of car competitive events are shown.

Club members' vehicles include all the well-known British sportscars and touring cars ranging from the ubiquitous M.G.'s to the fabulous Aston-Martins imported incidentally by ex-Avro Canada employees, Jack Gillies and Charles Wheat-

on. Motorcycles range from the smallest two-stroke machines to the record-breaking Vincent - H.R.D. on which member Edward Stidolph established the Canadian speed record of 119 m.p.h.

Probably the most spectacular and ambitious event so far conceived and executed by the club was the Sports Car Grand Prix run at Edenvale Airport near Barrie which is now abandoned by the RCAF and in private hands. Circuit races on an irregular 1-3/4 mile course were run for cars of various engine capacity groups. The fastest half of the competitors ran in a Grand Prix type of event featuring a Le Mans type start and a compulsory pit stop for a wheel change. James Cooke driving an XK.120 Jaguar won the event and put up the record lap time of 65.6 m.p.h. average.

A full programme of car and motorcycle competitive events has been laid on for this year. Won't you join us at some of them?

**FROM *Frozen* TORONTO 3 HRS.  
TO *Sunny* FLORIDA**



DON ROGERS, OUR CHIEF TEST PILOT, AND BILL WILDFONG ON THE BEACH AT MIAMI, WHERE THEY RECENTLY WENT VIA JETLINER

## PRINTING FOR PLANE MAKERS

*by Fred Davison*

SUPERVISOR, PRINTING DEPARTMENT

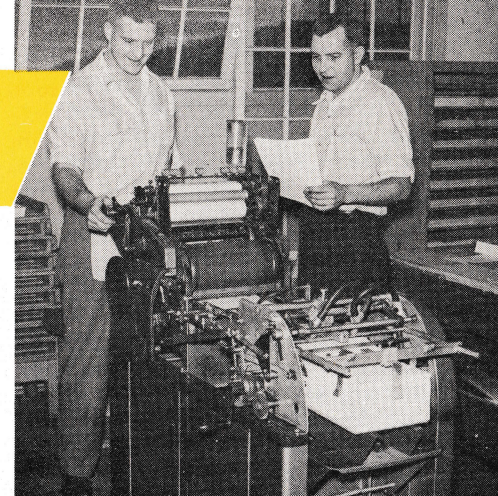
The amount of paper work required to produce an airplane is said to equal the weight of the plane itself. This is an understatement.

Probably in no other industry is so much paper work required. Particularly this is so during a period of development.

From its inception Avro Canada was aware of this fact and realizing the need for a quick source of supply of the necessary forms chose to set up and develop its own Printing Department.

The Department was set up in a modest way early in 1945. At that time the equipment consisted of one Offset Press and one Gordon Press together with a paper cutter and paper drill. At that time the Staff consisted of three people. The Company's entire personnel numbered about 300.

As the Company expanded to its present payroll of 6000-odd it was, of course, necessary to enlarge the Printing Department. This has been done until at this time the department has 10 employees and its equipment now consists of five Offset Presses and two Flat Bed Presses with other allied equipment.



GRANT GALLAGHER, MULTILITH OPERATOR AND MURRAY MUNRO, COMPOSITOR, ON THE JOB

The Department produces about 95 percent of all Company forms as well as numerous brochures, folders, manuals etc. "Avro Canada News" is produced and printed by our own men and women within the plant. The number of printed impressions produced on the Department's equipment is in excess of 2,000,000 a month. This involves between seven and eight ton of paper per month at a cost of about \$2500.00.

There are in use throughout the company about 1600 various forms. These are carried in stock by the Stationery Section for disbursements to the various Divisions and are reprinted from time to time depending on consumption. These are considered "run of the mill" items by the printing staff. However, the printing of the many brochures used in promotion work by Sales and Service Department is of particular interest to the printing department staff as all



are conscious of the importance of producing the best possible job. Many persons are involved in the compiling and printing of such a brochure. First and foremost is the assembling of the necessary data. This involves many hours of research, the accumulating of much information, the sifting of the chaff from the wheat. Many sources are used for the garnering of this data. After the sifting process the remaining information is then assembled in some kind of continuity. This is revised, deletions and additions are made, until finally a working draft is ready. While this is going on the Illustration Section is preparing working drawings which will be used as illustrations in the printed brochure. At the same time Printing is consulted as to the type of paper to be used, the color of inks, (most brochures are two or three color jobs), the type of binding and many other details.

After assembling all the material a dummy brochure is made up and the work of the Printing Department then really gets under way. Type is set up for the headings and sub-headings by our compositor Murray Munro. Captions for the illustrations are needed. Proofs are then pulled and turned over to the Illustration Department for the preparation of photo proofs. Upon completion the photo proofs are turned over to the Photographic Section who then prepare the printing plates. The completed printing plates

are sent to Illustration where they are checked for any imperfections and if all right are forwarded to Printing along with the working dummy.

Printing then goes into high gear. The paper stock is cut, the inks prepared, the pressman informed he is not likely to see his family for some days, and the wheels start to turn. During the "running" of the job there is a continual stream of illustrators, photographers, plate-makers, compilers and other sundry gentlemen, (at this point, we use the term "gentlemen" loosely), hovering around the pressman, making suggestions, asking questions, offering advice, checking the copies coming from the press and generally making a d---- nuisance of themselves. Despite all these handicaps the pressman finally completes the book and is allowed to return to the bosom of his estranged family.

The pages are then collated and bound and the completed brochures are delivered to Sales and Service.

The Printing Department like most of us, is still suffering from growing pains, and problems arise from day to day that tend to keep us on our toes, but thanks to a good staff we are able to sustain our motto, "The difficult we do right away - the impossible takes a little longer".

There is a good deal of satisfaction in knowing that the work our printers produce is looked upon by printing craftsmen as better than average.

# MACH

HIS NAME BECAME A NUMBER



A HOT-TEMPERED German physicist who finally made his peace on this earth thirty-five years ago in Munich at the age of seventy-eight would be completely disgusted if he could return to learn why his surname is now in common use.

Professor Ernst Mach would find that his fame rested, not on his exhaustive and beloved work on the philosophy of science, but on a common term used to express the speed of aircraft in these jet-propelled times.

The expression is "Mach number," and the pronunciation is "Mock." While the proper phonetics would probably give the nineteenth-century scholar no particular pleasure, it would certainly irritate him less than "Mac," or "Match."

The life and career of the distinguished scientist, who wore a beard appropriate to the Austro-Hungarian empire, is less known now than the meaning of the term, Mach number. The question: "What is a Mach number?" is sometimes asked. But it is seldom that anyone inquires: "What is, or was, a Mach?"

The first question may be easier to answer than the second. The Mach number is the ratio of the speed of flight to the speed of sound. Mach number 1 is flight at the speed of

sound. Half the speed of sound, for example, is Mach number .5 and a speed of twice that of sound would be Mach number 2. When an airplane has a top speed equal to that of sound, the aircraft is said to be a Mach 1 airplane.

Mach 1, or the speed of sound, is 761 miles an hour, but not always. At this point the aeronautical engineers rub their hands briskly and move in to point out that the speed of sound changes according to the temperature of the air. The speed of sound is 761 miles an hour at sea level with the temperature at 59 degrees. But the higher an airplane flies, within limits, into the cold thin upper air, the slower sound travels.

The Mach number is important because pilots and designers are much more interested in their airplanes' proximity to the so-called sonic barrier than they are in ground speeds. The sonic barrier, reached when an object attains the speed of sound, consists of air piling ahead of the moving object. Shock waves are formed, and the aircraft is subjected to severe stress. The swept-back wings of jet aircraft provide one way of splitting the sonic barrier.



There were no jet airplanes -- in fact no airplanes at all -- when Ernst Mach first looked into the ratio between the speed of flow of gas and the speed of sound. The ratio that has proved so handy in modern aeronautics had its genesis in the 1880's, some fifteen years before the Wright Brothers made their first flight.

Mach, who at the time was professor of physics at Prague University, and a Professor Salcher, of the Marine Academy in Fiume, carried out the experiments with cannon shells. With the assistance of the Royal Austrian Navy, which provided the gunfire at Fiume, the scientists took some eighty photographs of shells in flight. Fired at different muzzle velocities past metal plates of a condenser attached to a Leyden jar (or battery), the shells took their own high-speed photographs by causing the discharge of sparks.

In discussing the visible shock waves produced by the shells in these early Schlieren photographs, Mach commented that sound waves from the end of a rod moving through fluid would "have as an envelope a cone." From this analysis came the term "Mach angle," which scientists handed about in their papers until it came out as Mach number about twenty years ago.

Although academic, Mach's life was not a quiet one. A man of strong convictions, he expressed his opinions vigorously in feuding with various schools of philosophy and physics. His

own ideas on the nature of space, time and motion were the basis of a movement known as "positivism"; it is said that Mach's philosophy influenced Einstein.

His exasperated school-teachers believed him a "slow" boy, and it was not until his father, Johann, took him in hand that he began making progress in mathematics and physics. Mach's father, who had been a tutor, whetted the boy's interest in science with simple experiments at home. One demonstration especially intrigued the boy. It consisted of pushing inverted tumblers into a tub of water to show the pressure of the air captured in the glasses. So began a study which included, in 1889, the first photographs of supersonic air jets.

Mach would believe that today his name is recalled in connection with work that was comparatively trifling. But the high-speed aircraft and rockets of this second half of the twentieth century make it certain that his name will be used more and more frequently. That is true, at least, in the English-speaking world. Nor does Mach lack the Russian disapproval which usually indicates a scientist's preeminence in his field. In Russia the term is often "Bairstow number," (Professor Leonard Bairstow, English aerodynamicist) instead of Mach number. One of the persons with whom Mach differed philosophically, you see, was Nikolai Lenin.

REPRINTED FROM "THE BEEHIVE"



## AROUND THE GROUP

by Ian Scott-Buccleuch

A recent news report states a large pre-Korean order for Avro Manchester Shackletons is likely to be increased when deliveries get under way. The importance of the Atlantic Pact nations maintaining an adequate and efficient anti-submarine force ready for immediate action cannot be overstressed. The Russians are reported by Jane's "All the World Aircraft" to have a fleet of 350 to 370 submarines a much larger fleet than that with which the Germans embarked on World War II.



Another A. V. Roe aircraft is playing an invaluable role in British defence plans. It is the A. V. Roe 707-B delta wing research aircraft. It is thought in some quarters, that Britain, in order to ease production problems is endeavouring to eliminate the swept wing stage in the evolution of fighter design and go straight to the delta wing configuration. At any rate, a considerable amount of aerodynamic research is being carried out with the 707-B and the higher-powered Boulton Paul 111. The 707-B powered by a Rolls Royce Derwent engine is intended for investigation at the low speed end of the flight range

leaving the high speed research to the higher powered B.P.-111. Both these aircraft are equipped with tail parachutes to act as landing brakes.



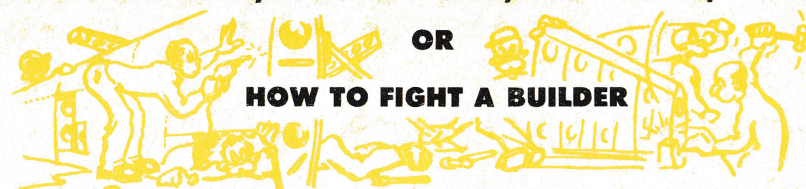
The Gloster Meteor Night Fighter N.F. 11 was developed and is now being produced by Sir W.G. Armstrong Whitworth Aircraft Ltd. The extended nose of this aircraft houses the radar equipment, the 4 x 20 mm guns having been moved to the wings. RAF night fighter squadrons are being re-equipped and expanded with the Meteor N.F. 11. Gloster Aircraft are also reported continuing production of the Meteor 8 and two new reconnaissance versions of this famous aircraft. With Meteor 8's on order for the Royal Australian Air Force it is expected that this will be the first Commonwealth jet aircraft to see action in Korea.



It has been announced that the Armstrong Whitworth A.W. 55 Apollo has been granted a Certificate of Airworthiness by the British Air Registration Board. It can therefore now be used for commercial passenger operations.



## AVRO ALL FIGHT, LONG WEATHER, HIGH RANGE, SPEEDER



### OR HOW TO FIGHT A BUILDER

This is just a quick up-write to show and try you how eff muchort goes into fighting a builder.

When the prodished finuct slistles wheekly overhead, per what centage of you binks thack to the specifinal originications?

What of the stany meps of engufacturing manting and draftineering? But let us bo gack to the denitail incision to forle a fighter for the air make. Geo strictly graphical are the flinching cactors on which the base is designed. Because of our barer iggea than the ustated nites, high weather, long speed and all fight are mefinitely a dust in a type craft of the air range for can in useada. But to shorta cut story long, Avro stot itself guck with airing a make craft in their quite plant sized big Malt at Outon in Ontern Southario.

The "boy room backs" bear their broughts to brain on the problem and thousands of en- ginical and techneering, draw- tail deings were prepared, lofter masts life in to sprdng, and shozens of deets of calcu- tailed delations were chifted and secked. Even at stis thage, the wesses must not be too guild

(knowtimes some as "estirate accumates"), or at a dater late some break mightpart in a sity trickuation.

One of the procenating fas- cisses used indrawing from the get stage to the styng flage is loto phofting. In a glaze of blory (looking like a Hollyset wood for an extracal musivag- anza) the lofter masts get their photails detographed, and by recessing the proverse, specially sheetized sensits become lofties of the originalcops. As soon as all the lawings and drofts are proleased to the reduction de- partment, mings thart to stove.

Nouters, ribblers, and shetalmears known as guill op- erated powerotines, play into come and start sheeting up the mets of cutal, brower pakes and baw drenches start whumping and bizzing, mulming up the fortitude of seeded nections. Mar spills chow thrips air into the high, pressdraulic hys bump great pushes where needed, press stretch benders make wifficult dork eas looky, and all the gothis is timing on, a skilly highed meam of ten are faking migs and jixtures.

Soon the main poups of grarts are shaking tape, were a

hing (stort or parboard) there a sose nection, a fuse of lineal- ages down the shopper of the cent, and anting everywhere like swarms the build planers, cor- tisans to the arte.

Well, there's not lech muft, but to trig this and rim that, inst the fitruments, under the fit carriage, and least but not last in mot the stallors (tints and hips on which have algiven been ready). The shaint pop ships each get up like a dollion millars and they are read ally for tight flesting, and stop we will here, while some saniges of vestity remain.

Time other some our cor- cial sperispondent will low you the give down on the part and ractice of test flighting. Miss dont it, or your comcation will not be eduplete.

Rid Dowding

Yeldir Gnidwod



ANDRE ST. PIERRE, AVIATION EDITOR OF LA PRESSE, IS SHOWN SOME OF THE FEATURES OF THE JETLINER BY W. N. DEISHER, VICE PRESIDENT AND GENERAL MANAGER

## TURBO-PROP OR TURBO-JET?

CONTINUED FROM PAGE 6

and fuel rearward to drive the plane forward - just as a propeller on a propeller-driven aircraft "propels" a mass of air rearward to drive an air- plane forward. In general, a turbo-jet acts on less volume of air - its intake being a frac- tion of the size of a propeller plane area - but propels it rearward at a much higher speed than does the propeller.

As to the relative merits of the two types of turbo-jet en- gines, there are many claims and differences of opinion. For a while it appeared that the cen- trifugal flow type would be much easier to keep clear of ice. Re- cent research and development, however, indicate that either type can be kept free of ice with as good as or better depend- ability than a reciprocating en- gine. The centrifugal appears to be best suited for low main- tenance cost, although it does appear that the axial-flow type engine offers the best potential for lowering of specific fuel consumptions.

It is probable that in com- mercial air transport use both the centrifugal flow and axial flow will see substantial ser- vice.