

The Victa Air Tourer Enters Production Phase

The Victa Aviation Division has had many false starts, but the Air Tourer is definitely in production, with the all-metal production prototype due to fly next month.

By STANLEY BROGDEN

PLAGUED by too much advance publicity and a maze of promises that had little that was real about them, the Victa foray into aviation has so far been rather a sad story. Orders were announced and great plans discussed, but the facts today are these: Victa will build the Air Tourer at the rate of one a week all through 1962. The R2 has been dropped. The "orders" boil down to two definite orders — for three Air Tourers from the Royal Aero Club of NSW and two for the Latrobe Valley Aero Club. Despite the shortage of real sales in advance, the Victa organisation is proceeding with the Air Tourer project, but has cut down the original ambitious schemes to the present reasonable and sensible development.

The £300,000 investment by Victa Ltd. in the Aviation Division will frankly be a gamble. It is being undertaken largely because it fulfils a dream held by the 65-year-old Group chairman and founder, Mr M. V. Richardson, for more than 40 years — that he would get into aviation. This may seem a dramatisation or an exaggeration, but it is frank truth. This man is prepared to lose a good deal of that investment, perhaps even all of it, for another reason, too. He believes he owes something to the country that has been so good to him and that his way of paying the debt is by developing the light aircraft industry. If this seems naive, then perhaps the fault lies in ourselves rather than Mr Richardson. In him are preserved, it seems, a good many of the pioneering ways.

In less than eight years this man has become a millionaire, though at 58 he was a salesman with less than £500 in the bank and worried about the future. Until now his firm has never borrowed money, for he has financed the entire development out of operating profits, while nevertheless running a profit-sharing scheme with his employees. He still insists that a large part of his assets are held in cash, available on signature to a cheque. This in a firm which reached a peak turnover of more than £8,000,000 a year in mechanised lawnmowers alone—against the competition of 35 other manufacturers.

Fantastic? Of course it's fantastic. Then why boggle at the idea of such a man being so grateful to the country that he is prepared to lose a few hundred thousand

in an aircraft venture, particularly as it has been a life-time ambition to get into aviation. It is a dream come true that he commutes from his waterside home to Bankstown, beside his Milperra factory complex, a 50-mile flight in an amphibian. His 28-year-old son, G. B. Richardson, recently designated deputy chairman, is the champion aerobatic pilot of the Royal Aero Club of NSW. His firm in 1959 pioneered the use of an aircraft (Cessna 182) to fly executives around the State and to maintain contacts with local agents. The Cessna has been replaced by the larger Beechcraft Bonanza.

Aviation is not a new field for Mervyn Richardson. He and his brother were aviation-crazy in 1906/7, when they never ate sweets or had any other use for their pocketmoney other than buying aeronautical magazines. He says today that they would literally know the contents from cover to cover, including the advertisements. Their reactions to such study were violently different, so full of disagreement that to resolve their differences on the basic tenets of design and construction they had to build an aircraft each. "Let the better aircraft fly," was the idea.

"We did not have the time to play footy with the other kids or get into any sort of mischief," says Mr Richardson. "We spent any spare time we had—nights and weekends — in a high loft in Paddington, standing ankle-deep in sawdust and wood shavings, working on the aircraft. I think my brother won, though his aircraft did not fly, as we had no money for engines. But his was of a more advanced design than mine." In any case, even if they had possessed the money to buy an engine, they liked none of those available in Australia at the time. They then decided to change this state of affairs.

Neither of the Richardson youngsters had any engineering background. Mervyn was apprenticed to a diamond setter and his brother to an engraver, but they designed and built their own aero engine on lines quite different from those generally accepted in the early 1910s. Their ideas attracted a good deal of attention, so that when they joined up the Army discharged them to

Air Tourer Details

By HENRY MILLICER (Chief Designer)

THE Victa Air Tourer is a low wing tricycle undercarriage 2-seat aircraft of light alloy all-metal construction. Although retaining the outward shape of its wooden prototype Air Tourer Mk. 1 it is a completely new advanced structural design. It becomes now a fully aerobatic trainer and tourer intended to replace the obsolete military trainers in the Aero Clubs. Its docile flight characteristics coupled with the extreme manoeuvrability of its wooden prototype are retained. Emphasis has been placed on low cost, simplicity of structure and ease of maintenance.

New Features: The Victa Air Tourer differs from its wooden counterpart on several points based on experience gained from the prototype which has flown over 500 hours in the last two years. It is, as stated, of all-metal light alloy structure throughout, using very light skin gauges with novel forms of reinforcing thin sheets wherever it was found necessary.

Powerplant Installation: The powerplant is a Continental C90 with an optional fitment of the Continental 0-200 or a Lycoming 0-235. A redesigned cowling with longer and more slender lines and with the thrust line offset to eliminate engine torque on takeoff and climb is a new feature. An all-metal propeller of the Sensenich or McCauley type is a standard equipment. The engine cowling consists of four parts, with two large top flaps hinged along the top surface enabling complete maintenance to be carried out without removing the cowling or propeller. The exhaust system has been redesigned and the number of augments tubes has been reduced from four to two in order to reduce costs and improve serviceability. The whole of the electrical control sys-

tem and battery, the hydraulic system and the auxiliary fuel pump, are located on the firewall and are fully accessible when cowling flaps are raised.

Fuel System: The fuel system has been redesigned around the flexible rubber type fuel tank placed centrally in the wing centre section. The electric type fuel contents transmitter is placed inside the tank and an electric fuel gauge on the dashboard. The fuel supply has been duplicated by adding an electric type fuel pump in parallel with the standard engine driven pump. The fuel tank shape has been redesigned to reduce to a minimum the unuseable fuel tank capacity.

Undercarriage: Although the landing gear still consists of automotive type shock absorber and spring on the nosewheel leg and a leaf spring type main leg, the attachment of the latter has been redesigned to fit under the main plane as a fail safe structure. The nosewheel leg steering and scissor links have been placed under the engine cowling in order to reduce their wear and reduce the aircraft drag.

Control System: The former type of control system has been retained but the flap control lever has been redesigned and repositioned to reduce the handling loads in flight to less than half of the original prototype values. The aerodynamic over-balance tendency of the aileron with flaps down has been eliminated, whilst the available rate of roll has been increased to 110 deg. per second at 120 kt. The elevator trim, formerly of "cheese-cutter" type, has been replaced by a trimming wheel placed under the centre arm rest.

Cockpit: A new sliding type cockpit canopy is de-

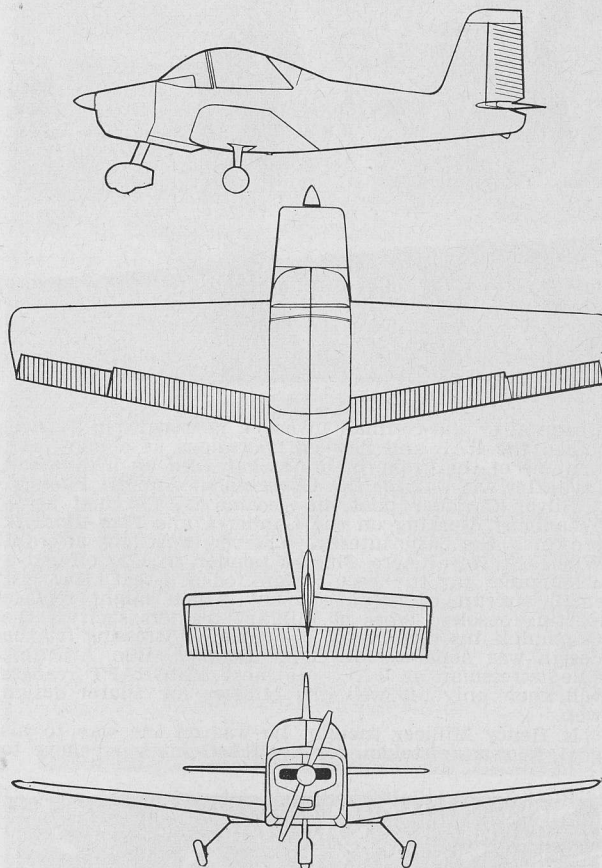
work on their aircraft and engine. As can be seen from the accompanying photograph, the aircraft which the brothers developed in Sydney boasted a square-tipped single wing and had contra-rotating propellers, no less. In a word, this was the first aircraft designed and built in Australia which possessed any novel features by world standards and which might offer something new to aviation progress. The Army provided a test pilot, but while he was awaiting fine weather he was anticipated by Mervyn's elder brother. Young Richardson decided to try taxiing.

"Neither of us had any flying experience at the time," says Mr Richardson, "though in theory we could perform great feats in the air. I tried to talk him out of getting into the cockpit, but he was adamant. I watched helplessly as the aircraft taxied erratically across the green field, gathered speed and suddenly lifted one wing. My brother tried to counter with the controls but one of the landing wheels hit a bit too hard, collapsed under the wing, and . . . well, the rest went with it. There was not much left."

That was the end of the Richardson attempt to provide the waiting world with a new type of aircraft. The lads did maintain some interest — they attended flying displays. Mervyn around 1919 forecasted that by 1930/35 aircraft would be flying at 400 mph: the experts laughed and said the pilot would be certain to fry to death if he did not boil. The hard facts of life then took him full time into the job of making a living. They were hard and lean years and at 53 he was £500 ahead of the game, with a wife and son and only a salesman's prospects. But he still tinkered and from that tinkering came the world's first really successful motor mower at a reasonable price, powered by a two-stroke petrol engine. Experts all over the world had been trying to solve problems which he solved in his small backyard shed. He was talked into investing his savings in producing the lawn mower and millions were on the way to him. Probably no other man has ever done more to free the Australian married male of week-end drudgery and the results were quite fabulous.

But the urge to aviate remained. For 40 years Mr Richardson had maintained his interest in flying. As soon as big money came he invested in business aircraft, his son took up personal flying, and he looked about for a possible avenue.

Two other men in Australia were suffering from frustration in their dreams of success in the aviation field. Both were designers—Henry K. Millicer, MSc, AFRAeS, and Luigi Pellarini. The Millicer saga was a curious one. He is a Pole by origin, now a naturalised Australian, who had learned the fundamentals of aircraft design in the Polish industry before the war. Lucky to



Three-view diagram of the all-metal Victa Air Tourer. Main external differences from the wooden Air Tourer, which has completed over 500 hours flying during the past two years, are the redesigned cowling and undercarriage and the new sliding cockpit canopy. See below for data.

signed with aerodynamic characteristics tending to lock the canopy when in a closed position. Particular attention has been paid to the high noise vibration level of the prototype and the insulation of the engine bay and cockpit walls is aimed at reducing the noise level to that of the Beechcraft Bonanza.

Structure: Wing main spar is continuous from tip to tip, designed in extruded "T" sections. Pressed light alloy ribs. Simple channel type rear spar of constant sections. Wide walkway of heavy duty skins provided on either side of the cockpit; these heavy duty skins, apart from serving as walkways, also take and distribute the main undercarriage leg loads. In flight, they pick up the aerodynamic loads from the wing torsion box and distribute them into the fuselage pickup points. These consist of two front shear pins engaging into the fuselage frame fore and aft, and two rear spar pick-ups with shear bolts; the latter, when taken out enable the wing to be slid back and out in a matter of minutes.

Flaps and ailerons designed as ribless structure with fluted skins of very light gauge. Mass balanced ailerons and flaps. Flaps and ailerons are interconnected by a simple differential linkage between them. There is no control linkage of any sort inside the wing proper, eliminating the necessity for any inspection holes, etc.

Wing centre section contains a single cell fuel tank of rubber bladder type with a double wall structure around it, reinforced with plastic foam between skins, all stressed to 25G impact load.

The fuselage structure follows the conventional skin and longeron type with only half of the number of frames of the original prototype. No double curvature skin panels are used. The rear fuselage can be detached from the cockpit in case of a serious accident when the aircraft breaks her back just beyond the cockpit, in which section replaceable or removable sections of longerons were put in, in order to facilitate the

repair procedure. The bottom of the rear fuselage is skinned with heavier gauge and a steel tail skid is fitted in, both being provided to prevent any damage to the rear fuselage in tail down landings.

Tail Unit: The whole of the tail unit consists of conventional structure fin and tail plane and of ribless structure with fluted skins on elevator and rudder, both of which are mass balanced to prevent flutter at the high diving speeds for which this aircraft is designed. The same type of structure as used for the flaps and ailerons is also used on the rudder and elevator throughout.

New Standard Equipment: The electrical system consists of cockpit lighting and navigation lights as standard equipment with a rotating beacon as optional. The engine is equipped with a starter and generator as standard equipment. Cabin heating and ventilation are provided as standard equipment. Ash trays will be provided because the fuel system is redesigned with the fuel cock completely hidden and shielded by the cockpit keel members.

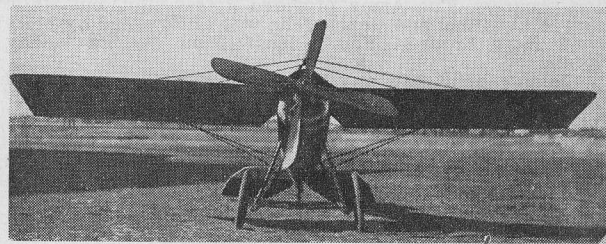
BASIC DATA: Powerplant — C90-12F Continental (takeoff BHP 95) or Lycoming O-235 (takeoff BHP 115). Propeller—metal, fixed pitch. Type and construction—low wing, all metal. Empty weight 880 lb. Gross weight 1600 lb. Useful load 720 lb. Full aerobatic clearance 9 G.

Performance Details (with C90): Max. speed at sea level, 135 mph. Cruising speed 130 mph. Best rate of climb at sea level 800 ft. at 1500 lb. Range at AEW 800 st. miles. Takeoff run 600 ft. Service ceiling 15,000 ft. Stalling speed, flaps, 53 mph. Landing run 500 ft. Design diving speed 253 mph.

General Details: Wing span 26 ft. Length 20 ft. 9 in. Height 6 ft. 10 in. Wing area 120 sq. ft. Wing loading 12.5 lb./sq. ft. Power loading 15 lb./TO BHP. Fuel capacity 30 Imp. gal. Flaps NACA. Dual controls. Cabin width 42 in. Cabin length 68 in. Seating capacity 2. Soundproofing. Hot and cold air. Brakes hydraulic, disc type. Parking brake. Steerable nosewheel. Undercarriage fixed tricycle. Landing lights optional.



Victa chairman and founder M. V. Richardson (centre) with Luigi Pellarini (right), designer of the shelved R2 prototype shown here just before a test flight by F/L Randy Green (left), who will also test the Air Tourer. Seen below is the aircraft which Mervyn Richardson and his elder brother developed in Sydney during the first world war.



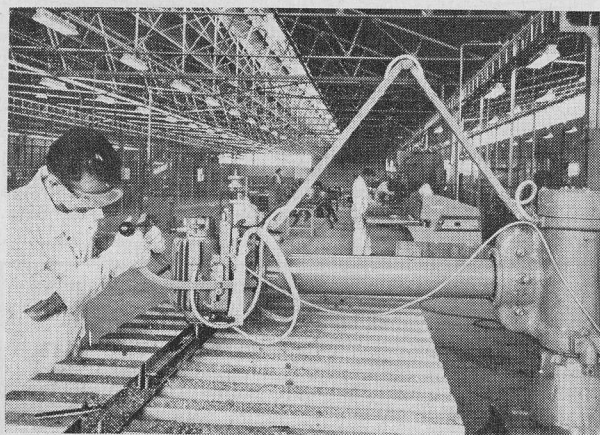
escape after the German invasion, he fought in France, joined the RAF and flew on operations as a pilot, and was one of the group of brains gathered up in England just after the war for the Government Aircraft Factory. A Silver C glider pilot, he became GAF's chief aerodynamicist, working on the Canberra and Pika-Jindivik projects. His basic interest, however, was light aircraft. When the Royal Aero Club in London in 1953 offered a £100 prize for the best design for a 2-seat, low cost small aircraft of great economy which might replace existing obsolete types of military trainers such as the Chipmunk, his was one of 104 entries. Stressing for the design was done by Mr G. D. Bennett, BSc, AFRAeS, chief stressman at GAF. As most AIRCRAFT readers will know only too well, the Millicer Air Tourer design won.

If Henry Millicer thought he was on the way to his goal, he was mistaken, for the RAeC made no move to

interest possible manufacturers and did not even reply to his letters. Meanwhile, the M-B Design Group had been formed, with DCA approval for design in the glider and light aircraft field. When it became apparent that the RAeC and the UK were not interested, the Group decided to build its own prototype. From this came VH-FMM. Built with wood, for the sake of cost, and powered by a Continental A-65 of 65 hp instead of the planned 95 hp, the prototype first flew on April 10, 1959, and secured a C of A on July 30 the same year. This was the first aircraft designed and built in this country to achieve this status. The achievement did attract attention from several possible production organisations. East-West Airlines got down to brass tacks with Mr Millicer and at one stage all had been decided only to be abandoned when East-West switched its money to more immediately lucrative fields. Then there were discussions with the Australian de Havilland organisation which broke down on the problem of who would cover the cost of tooling and getting to the stage of flying the new prototype.

When the Victa interest became apparent, Mr Millicer seized the opportunity, resigned from GAF with a small group that now forms the nucleus of the Millicer-headed team on the Air Tourer project at Milperra, and rejoiced at the fickleness of Fate. He joined Victa in October 1960.

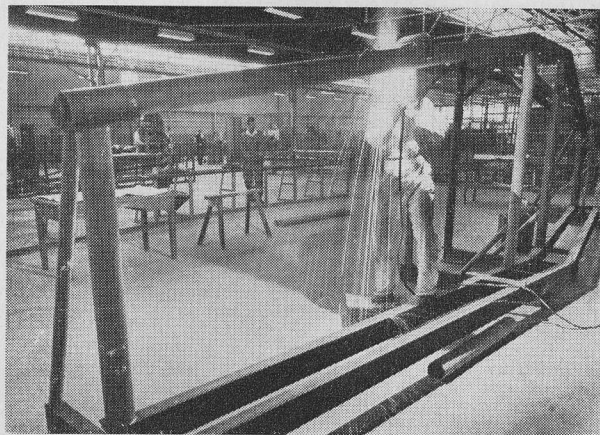
The first plan was to build 50 Victa Air Tourers and sell the lot to the Aero Clubs through the Royal Federation of Aero Clubs of Australia at cost price, which was expected to be around £3000. This would, of course, have lost money, as it would have been a straight production cost without any loading for the capital outlay involved. The aircraft was to have certain radical modifications, the most important being a metal wing. DCA had made this mandatory, though it was also at all times in the Millicer plan. If this first development project had been adhered to, Air Tourers might have been on delivery long before they will be, but the decision was taken around September 1960 to make the aircraft all-metal. This was bound to hold up delivery, but it was a wise decision that pleased everybody. The idea of selling the whole first 50 to the Federation was dropped, partly because the first orders (or, in cold fact, letters of intent) came from New Zealand. The Auckland Aero Club gave a letter for six Air Tourers — and



General view of the Victa aircraft shop with router (in foreground) shaping a "T" section of the spar assembly.



LEFT: Another general view of the aircraft shop with the tool room in background. In foreground, chief inspector Doug Wilson discusses with the shop foreman details of rib form tools. Press brake in background is testing "T" section form tools. RIGHT: A wing assembly jig in construction. Immediately behind it can be seen the spar and nose rib assembly jig.



four R2s. The Royal Victorian Aero Club followed with an option on 15 and the Latrobe Valley Aero Club with one for two. The RAC of NSW has ordered three Air Tourers.

The position now is that the first production prototype—all-metal, with the 95 hp engine—will be flying next month. Target date for rolling-off production aircraft is the last quarter of 1961, possibly in November. In the first 12 months it is planned to build 50 Air Tourers, some half of which are expected to be taken up by the orders and letters-of-intent now in hand. This would depend on performance achieving what has been promised and on delivery time and price as compared with the French Morane-Saulnier Rallye and the Piper types. Victa hopes that the C of A will be secured from test flying the first production aircraft by October — test flying will be done mostly by F/L Randy Green, who made the first flight on the R2 at Schofields on February 15.

Air Tourer price is, however, a most foggy problem to the onlooker. The original £3000 price, without radio, is not practicable, although this price has not been changed to Aero Clubs. Victa says orders will now be accepted at £3750 from private buyers for the basic aircraft without radio. If all costs are taken into account, even this seems an unrealistic price. It takes very little figuring to work out that this aeroplane will be lucky to see an off-the-shelf selling price, with radio, of less than £4100.

The first aircraft chosen for Victa's Aviation Division was not the Millicer Tourer, but a 4-seater designed by Luigi Pellarini, afterwards known as the R2. Pellarini also was taken into the organisation. Both he and Millicer were given contracts and everything possible done to make a success of their ventures. Each had an independent design team and there were to be separate production lines.

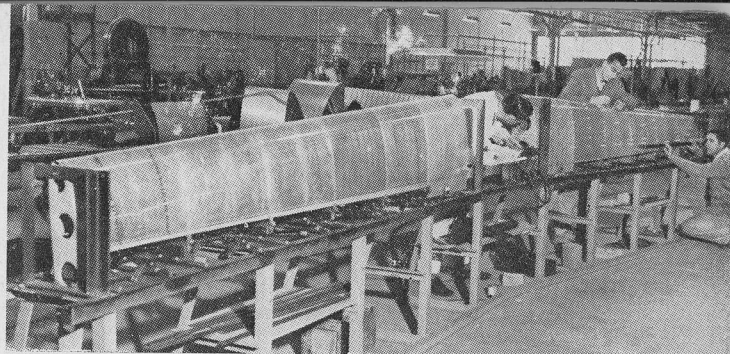
A separate building of 60,000 sq. ft. was erected for the Aviation Division. Machine tools were installed and material ordered. In the event, the R2 was dropped soon after the first flight and the project shelved. Mr Pellarini left the organisation and went on to New Zealand to take up the Bennet agricultural project. He was not regarded by DCA as a designer whose product was immediately acceptable, for they looked upon him as an architect rather than an engineer. That seems to have been somewhat unfair when one realises that Pellarini had often built with his own hands large sections of the aircraft he designed. But being a man of great temperament, he moved in a personal environment that has never been regarded with affection by many Australians. Victa handled him well, putting with him John Wheeler, ex-DCA, whose work was highly regarded in Melbourne. However, the R2 is apparently a thing of the past, for it is probable that Victa will allow Mr Millicer to make a four-seat redesign of the Air Tourer at some stage. The Victa Aviation Division is now centred on the Air Tourer. This decision to concentrate on one type was wise.

There were plenty of difficulties in the one project in any case. The problems of the original production were considerable. Various methods of producing the first model aircraft were considered before it was finally decided it should be made from production tooling. It was realised that this decision would delay production of the first aircraft, but the advantages were considered to outweigh the initial time-lag.

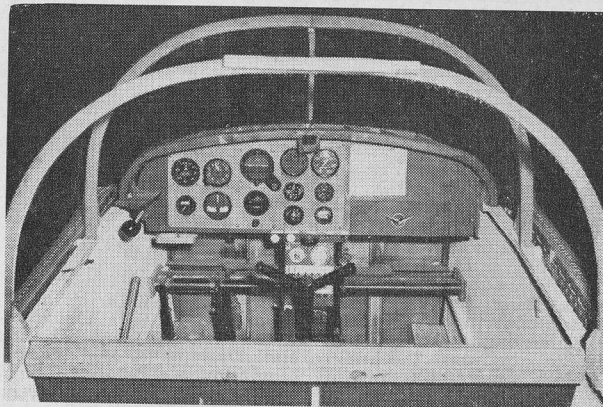
Tooling related to nose ribs and spars was begun first. As each rib required a master template, a routing template and form block, a large number of tools was entailed. Most of the rib tools had been completed by April, as had the spar drilling jig, spar assembly jig, and various spar member form tools. Pressing of the ribs and assembly of the spar and nose rib section of the wing were started in May.

In charge of the Aviation Division is F. J. Henstock, formerly assistant to the general manager. He succeeded R. C. Kerville, who left when the whole project was reorganised a few months ago. As well as the main production block costing £60,000 at the main Victa plant centre, a proposed £50,000 building at Bankstown, next to Rex, will house servicing and spares and provide hangarage. With the two-storey Milperra block and all the equipment concerned, the capital cost of Victa's foray into aviation will be not far short of £300,000. Toolroom, production machine shop, sheet metal and fabricating shop, plastics shop, inspection section, aircraft components store—all cost money. Of the 300 Victa employees (it was 900 until early this year) 50 are in Aviation Division. By 1962 this 50 may rise to 200.

There is no doubt that Victa was until a few months ago living in a dreamworld about its aviation prospects. Many of the people it hired had too much of the high-pressure sales approach, not enough experience of the facts of life in the aviation industry. The whole project was headed for disaster if the cuts had not been im-



The first Air Tourer wing leading edge at an advanced stage of assembly. On the bench behind can be seen various other skins, including the preformed and trimmed skins for the second air metal wing, each assembled in three stages.



Controls and instruments are thoughtfully grouped. Right panel may carry VHF or HF radio and ADF if required. Beneath the panel is map box. Y type control column has optional range, rudder pedals are individually adjustable.



Wing main ribs awaiting check in the View Room.

posed. Promises were made which simply had no basis in reality. Victa without question built up a poor reputation by this and it must be lived down. This can be done by picking the right men—an example is the recently formed Victa Air (NZ) Ltd., which is headed by Reg Shand, formerly CFI with the Auckland Aero Club. Sales here are now controlled by Cec Anderson, a private pilot who knows the score and has his feet on the business ground.

When the first production Air Tourer makes its promised demonstration tour of Australia, Aero Clubs which between them provided £1000 through the Federation to build the original Millicer prototype, will be allowed to fly the aircraft one hour for each £10 put up. This keeping of faith with the Federation can do nothing but good. Meanwhile, anybody who cares to visit the works — and a welcome hand is extended to all — will be impressed with the enthusiasm and assurance of the fellows on the floor. Most of the tool making is behind them, the first production aeroplane will soon be ready for flying and there is an obvious determination to prove they are a part of a Division that is going some place. There has been a reappraisal and an air of sober confidence prevails.

END.