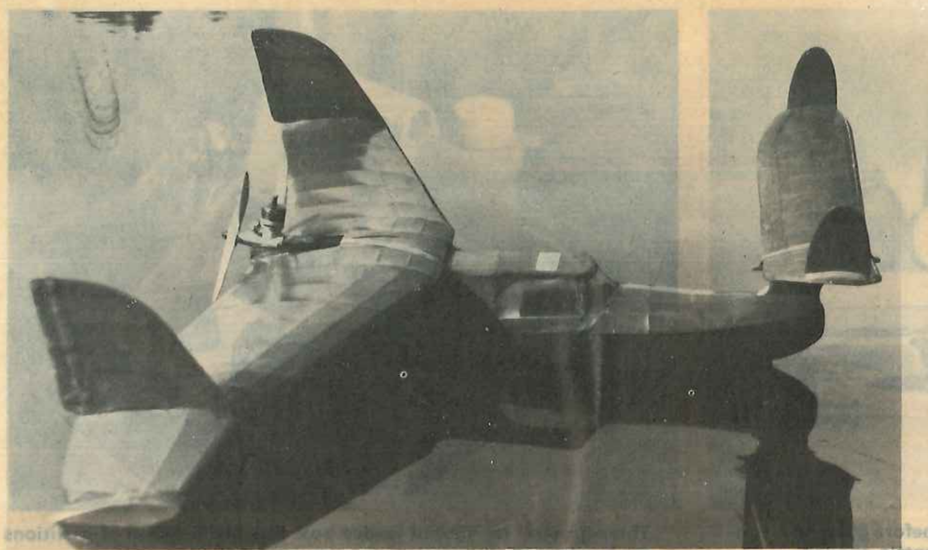


The author with his pride and joy. Canard has advantages over tractor for flying boats.

•PELICAN•

By JIM FULLARTON . . . A highly unusual canard seaplane pusher, originally designed in 1956. Be the first in your block . . .

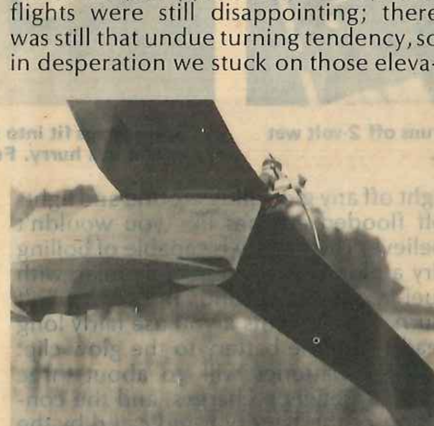
• Whatever way you look at it, the conventional single-engined flying boat is an untidy piece of work, and many years ago, the writer started thinking about the advantages which the canard layout appeared to offer in this class of aircraft. Biggest improvement seemed to be in the motor mounting; the most common conventional system seems to be the "engine-on-a-stick" mounting of the Lake, or if you don't like that, you can choose between the drastically cut away fuselage of the Seabee or the structurally unpleasant twin-boom arrangement. Whatever you do, that tail unit just seems to get in the way.

With no bow overhang up front, the canard hull will only be about 60% the length of the conventional tail-behind bird, and if you move the fins out to the wingtips, where they also act as end plates and float supports, you get what appears to be a very compact and attractive layout. "One day," we said, "we will build a could-be scale model just to see how it all works out." And there the matter rested; until 1956, to be precise, when a couple of keen young members of my wife's family, Max and John Fyfe, were looking for a project, and undertook to build the thing if I would draw it up for them.

This Mark I version would take off and fly all right, but suffered from what appeared to be a typical canard failing, in that it would wind up in a spiral dive at the slightest provocation, a habit which eventually terminated its career. Back into mothballs went the project until along to the rescue comes Henry Cole, writing in a Zaic yearbook. His article, in the writer's humble opinion, really put the lid on the great spiral controversy.

"Forward of the C.G.," says Henry, "dihedral or high C.L.A. is money in the bank, but behind it, keep a low profile."

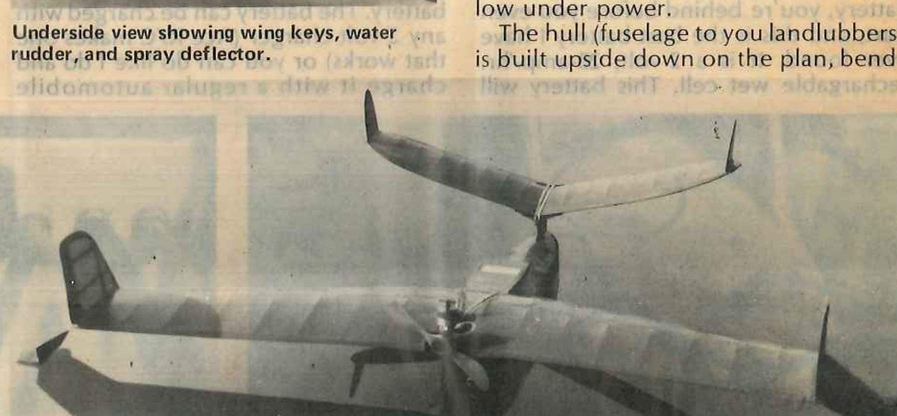
Inspired by this theory, we went back to the drawing board and, this time assisted by son Andrew, built a new flat wing, while the elevator was raised up on struts (the pylon came later). Test flights were still disappointing; there was still that undue turning tendency, so in desperation we stuck on those elevator tip fins. That did it; from then on she became a consistent performer. The final mod was the drooped wingtips, which improved things still further.



Underside view showing wing keys, water rudder, and spray deflector.

In the hypothetical full-sized version, the weight of the engine would be balanced by the crew, but in our case, we use lead and modeling clay packed in a weight box to get the correct C.G. position. Incidentally, the location of that C.G. is another thing we learned from Hank Cole, way back in a 1947 Air Trails. To minimize this weight, it pays to build everything at the back as light as possible. Use medium balsa where possible, and save the hard stuff for the spars. The mounting of the motor on the wing is a point we picked up early in experimenting with canards. It prevents the prop from chewing up the trailing edge every time the wing is knocked askew. That down thrust, which really produces a pitching up tendency, is another feature we have found necessary to prevent the model from hanging low under power.

The hull (fuselage to you landlubbers) is built upside down on the plan, bend-



You'd have to have quite an imagination to dream up a stranger looking model than the Pelican. Model uses an old Taipan .09 diesel, but a Tee Dee .049 would probably work well also.

4793

ing the sides around formers F1, F5, and the sternpost. Then add F2 to F9, after which the keel may be inserted, and the bottom covered with 1/16 sheet. The frame may now be lifted and the upper formers, F10 to F14, stood up in position, after which the cabin top frame is fixed in place. You will, of course, be using waterproof cement throughout; no P.V.A. on this job.

The best way to get a good fit for the elevator platform is to pin the two halves directly to the underside of the elevator and leave them there while you glue the pylon and fillets to them, all this being done before the pylon is fixed to the hull.

The "elevator" on a canard ("front wing", "foreplane", or whatever you choose to call it) actually works harder than the main wing, in that, for stability purposes, it must carry a higher load per unit area than the wing, and for this reason it needs a good, high-lift, late-stalling section. In addition, I have found that a simple cord turbulator helps to prevent premature stalling, and was interested to note that Doug Joyce had a similar experience with his "Lil Lightning" canard (June '76 **MB**). Weight is no problem at this end of the aircraft, so it will pay to make your elevator plenty rugged.

The wing is mainly straightforward, the only parts that are a trifle unusual being the drooping tip sections. These are built flat with the rest of the wing at first, but with the leading and trailing edges angled out from underneath at the joint. The whole wing is then blocked up 1-1/4 inches, after which the tips are bent downwards and the center spars added. Make all spar joints with doublers, as the tip floats can take a bit of punishment at times.

The mounting of the engine on the trailing edge poses a bit of a problem in providing rigidity, but you will find that the cap strip system takes care of that adequately. As the wing also carries the fins, it must be located accurately, and for this purpose I used 1/8 strips, contoured to fit the side of the hull, and cemented to the underside of the center section. The fins are shown with rudders and aluminum hinges which are epoxied in place, but actually, I have found it safer to leave the rudders alone and rely on the drag tab, and maybe elevator tilt for turn.

Before covering, waterproof the whole structure with a good coat of dope, just in case. The elevator, wing center section, top of the hull, upper sides aft of the cabin, and bottom sheeting forward of the step are all covered with silk, while tissue is used for the wing outer panels and fins. Be sure all holes and openings are sealed, and dope adequately, but not excessively. A suitable water and fuel-proof finish will complete the job.

Our tank was made from celluloid, which is OK for diesel fuel and lets you see how much fuel was in there, but where can you get celluloid now? It looks as though you will have to solder one up from brass shim stock, but remember, it will feed from the rear bottom corner. The original uses an old Taipan 1.5cc diesel, which provides more than enough power; in fact, it will take off on less than full throttle. For this reason, I consider that a good 1/2A contest motor would do the job just as well, especially as there would be a double weight saving, due to the reduced amount of ballast required to balance the lighter motor. The clublike propeller shown on the plans is needed, as a bigger diameter would not have water clearance, but whatever engine you use, try to provide one inch of clearance between the prop and the trailing edge for flicking it over. And please, don't overpower!

The trimming set-up is 1/4 inch of wash-out in the right wing, 1/2 inch of wash-out in the left wing (looking from the rear, of course) and with the tab bent down about 3/8 inch. The aim is to produce a right turn on power and glide. We found that due to torque, it tends to turn too tight under power, making it necessary to back off a bit by using a very slight amount of right thrust, which, on a back-to-front aircraft, has the reverse effect. Start with some hand glides over long grass, if possible, and then proceed to low power hand-launched flights until you are satisfied with the trim.

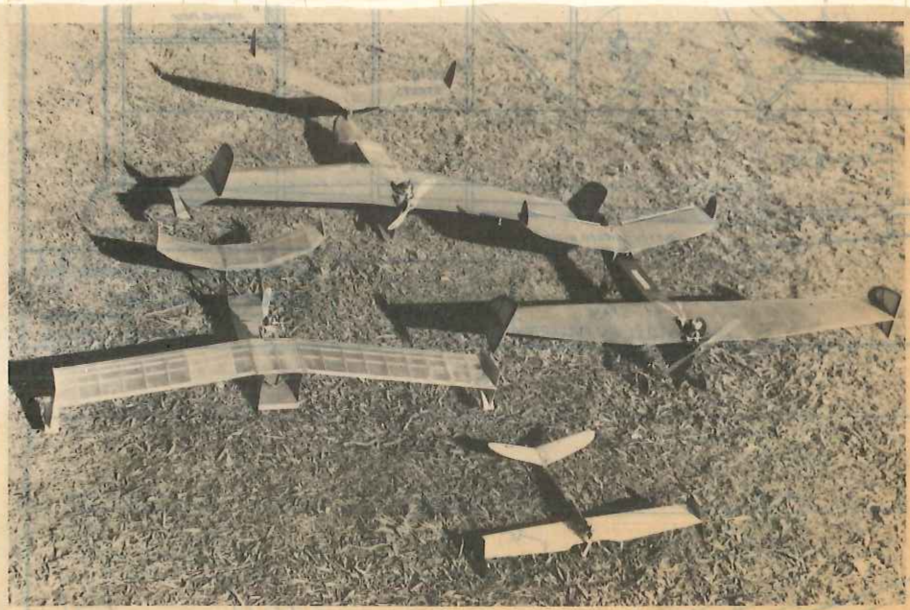
We have found that takeoffs are best made downwind, as this gives the necessary water speed to get over the "hump", and up on the step. Like the great bird for which it is named, the Pelican takes quite a long run before getting up and rotating into the climb. She runs very straight and can operate in a slight chop, but if the waves are more than a few inches high, the prop tends to clip them when it rotates to lift off, causing a loss of flying speed.

As an old free flighter, the writer is forced to admit that radio control does appear to have come to stay, and what is more, they tell me that they now have gear small and light enough to go into this ship, so we had better see what could be done about it. To start with, as spirals would no longer be a problem, the elevator could come down off that pylon and be set into the hull where it used to be. Then it could be provided with elevators (not necessarily full-span) for control in pitch. Rudder presents more of a problem, as the thought of running rods out to those wingtip rudders does not seem attractive. Instead, I would suggest replacing the elevator tip fins with a single forward steering rudder, located right up front, as in some of the old twin pushers. Ailerons would be optional, but if used, they could be operated by a mixing device to work as elevons, as is done on the British Lockspeiser canard.

And there you have it. Whether you use free flight or radio, if you are one of those who likes something a bit out of the ordinary, I am sure you will be happy with the Pelican. ●

MODEL BUILDER

Pelican taking off.



The Pelican isn't a one-of-a-kind ship, as this photo shows. On the right is the "Ascender", at the rear is the "Rezenebe", and the model on the left is the "Flying Punt".