



**OPERATION EGGBEATER.** Away from the frying pan into the flyer, Dorothy Rungeling, one of Canada's leading women pilots tries out Bell's Trooper.

# Fixed Wing to Whirly Bird

By Mrs. Dorothy Rungeling

**Part 1**

Have you ever tried to get the last olive out of the jar by stabbing it with a fork? If you have, you know exactly what trying to hover a helicopter feels like to a beginner.

Always fascinated by this humming bird type of aircraft, I had listened to many different opinions regarding helicopters.

Well, now I am finding out for myself and I don't at all agree with the people who are nervous in a helicopter.

In these articles I am attempting to relate my impressions and reactions to helicopter flying. At the risk of being thoroughly corrected by some old timers, I will try to explain the operation of helicopters as I go along in hopes it will help someone looking for this type of story, as I was in the past.

My instructor — a very capable one — is Bert Ratliff, Canadian Sales Manager of Bell Helicopter Corp. My

lessons are taken in a Bell G2 Trooper, a two-to-three place machine powered by a 220-h.p. Lycoming engine.

The first step was into the Trooper to find out what the controls were called and what they did when used. Entering the Bell helicopter is no harder than entering a fixed wing craft, perhaps even easier.

The most striking first impression is the visibility from the bubble.

After examining the pedestal carrying engine and flight instruments, which by the way are much the same as those of other aircraft with the exception of the tachometer, we turned to the controls.

In front of me, coming up through the floor at right angles, was a stick which looked like the control stick in a fixed wing craft. It is called the Cyclic Pitch Control. This control was to be moved in the direction in which you wished the helicopter to move. Move the stick ahead and the helicopter went ahead; move it back to-

ward you and the helicopter backed up; move it sideways and the helicopter moved sideways. This sounded fair enough.

Down at the left side of the seat was another control stick which jutted out of the floor at an angle of about 30 degrees. This is called the Collective Pitch Control. If this is moved up the helicopter rises. If it is moved down the helicopter descends.

This also seemed quite logical. However, this control does double duty because it serves also as the throttle. The throttle is the twist grip type used on motorcycles and is on the end of the Collective Pitch Control. Twisting it away from you opens the throttle.

So now I knew my left hand had to lead a double life.

Then there were the rudder pedals. They made me feel right at home. They were called Rudder Pedals and were put there to control yaw, just as they are in a fixed wing plane. The rudder pedals regulate the pitch on the tail rotor which in turn controls any yaw. So far it sounded all right, except that I couldn't see why they had such complicated names for the two sticks. Why couldn't they just call the one on the floor in front of me the "horizontal control" and the one by the side of the seat the "vertical control"; since that was what they controlled — horizontal or vertical movements.

With that both hands and both feet due to be so busy, I wondered how a gal powdered her nose before landing as she does in an airplane. Bert wasn't at all sympathetic.

When flying a helicopter, he explained by way of changing the subject, the rpm must be kept up at all times — in the Bell it was to read 3,100. I found out later that come hell or high water it MUST read 3,100, whether climbing, descending or in level flight. This of course is one of the things which is confusing to the fixed wing pilot. It partially accounts for the axiom, "You have to forget a lot you know about fixed wing flying, if you want to learn helicopters".

The critical instrument here is the tachometer, which has two hands on it. The long hand indicates the engine rpm; the short hand indicates the main rotor rpm.

These needles should be right on top of one another while you are flying. If they are separated more than the equivalent of about 200 rpm the main rotor is no longer driven by the engine but is free wheeling and you are in autorotation — or fixing for a

forced landing. This is O.K. if intentional, but could be disconcerting if it happened at the wrong place and time. Bert took the Bell off the ground and up to about six or seven feet. Handing the controls over to me he directed me to "keep it right over this spot".

I took over the sticks and rudder eagerly. At that moment the docile Bell ceased to be docile and turned into a wild animal. It was simply amazing how it got away from me.

Of course, the machine did exactly as it was supposed to do in response to my control movements. It was up to me to move them correctly and the right amount. This, I discovered, is a big order for the beginner. I'd think I had it pinned down only to have it slide out from under me — just like that slippery olive.

After considerable effort without staying within 100 feet horizontally of where I started out, not to speak of altitude gained or lost, I turned the controls back to Bert who showed me it could be done. It looked so easy.

Then another try for me. Still the Trooper refused to stay put.

Between my tries, Bert took over to let me relax.

### Lesson in Safety

Taking the Bell up to about 500 feet, he demonstrated how safe a machine it was. He cut the engine for a simulated forced landing. This is called autorotation.

The engine is no longer driving the main rotor blades and the helicopter comes down with Old Man Gravity pulling it just as hard as he can. The only thing you have to fight back with is the free wheeling main rotor blade.

The altimeter unwound at a merry rate. As we neared the ground, Bert raised the collective pitch control and we sat down nice and easy. The routine is to let the helicopter come down at its own pace until you near the ground. At this point the rotor still has enough energy from free wheeling all the way down to effectively change pitch when the Collective Pitch Control is raised. This cushions the actual touch down.

We did three of these — presumably to show me that it was a safe machine. I could concentrate on flying from here on, instead of wondering what would happen if the engine quit. Actually, I hadn't wondered at all.

My first lesson, approximately 45 minutes, was over in what seemed no time at all. I went home to think the whole thing over.

I was a bit provoked at myself for not having been able to hover. But I remembered Bert's remark when we first entered the Trooper. "Now when this lesson is over, don't feel discouraged. You will feel you have accomplished nothing. That's the way everyone feels and you mustn't be discouraged". So I wasn't.

I am a firm believer in the theory that a lot can be accomplished by mental practice. If a person goes over and over in his mind the exact motions which he knows he should make to accomplish a certain thing, he will improve even though he is not physically performing the act. At least he can put his mind in order as to that particular lesson.

I realized that I had been overcontrolling. I thought back to the way a student is taught in an airplane to wait for the airspeed to catch up after a movement of elevators.

Then I knew that I should have moved the cyclic pitch control only a small bit and waited to see what would happen. If nothing happens you

can always move it some more, but if it is moved too much then you start complicating things. Next time I would do better!

Hovering is evidently a very important manoeuvre in helicopter flying since you must land with absolutely no drift. In a fixed wing craft if we land with a little bit of drift we may skitter across the runway a bit, with no damage done. But a little drift in a helicopter can cause it to tip upon touchdown with damage to the rotor a likely result.

Hovering is simply the elimination of all forward, backward and sideways movement as a prelude to setting down. It is absolutely essential to a good landing. A little forward movement is permitted in landing even when the helicopter is equipped with runners but sideways or backward movements are unpardonable sins.

Next to this in importance is that 3,100 rpm which must be maintained at all times. I learned the importance of this must in subsequent lessons.



**UNDER GLASS.** Bell Aircraft's Bert Ratliff and student Dorothy Rungeling view and are viewed from the plexiglass encased cockpit of a Bell Trooper prior to first take-off.