

Simply the best?



Observant readers may notice that this report breaks new ground, for all the aircraft covered in the series have been products of the British aircraft industry. Not all originated in the UK as some were designs from other nations, built under licence, but this is the first type that has come wholly from an overseas source.

The North American Harvard (known in its country of birth as the Texan) played a very large part in the advanced training of most British pilots throughout and shortly after World War 2. There were two distinct versions, with the first of 400 Mark 1s delivered to the RAF in December 1938. Altogether more than 5,000 Harvards were used by the British and Commonwealth Air Forces and the majority of these were versions of the Mark 2 which, inter alia, had a light alloy monocoque rear fuselage instead of the earlier steel tube structure with fabric covering.

The Harvard is bulky and looks

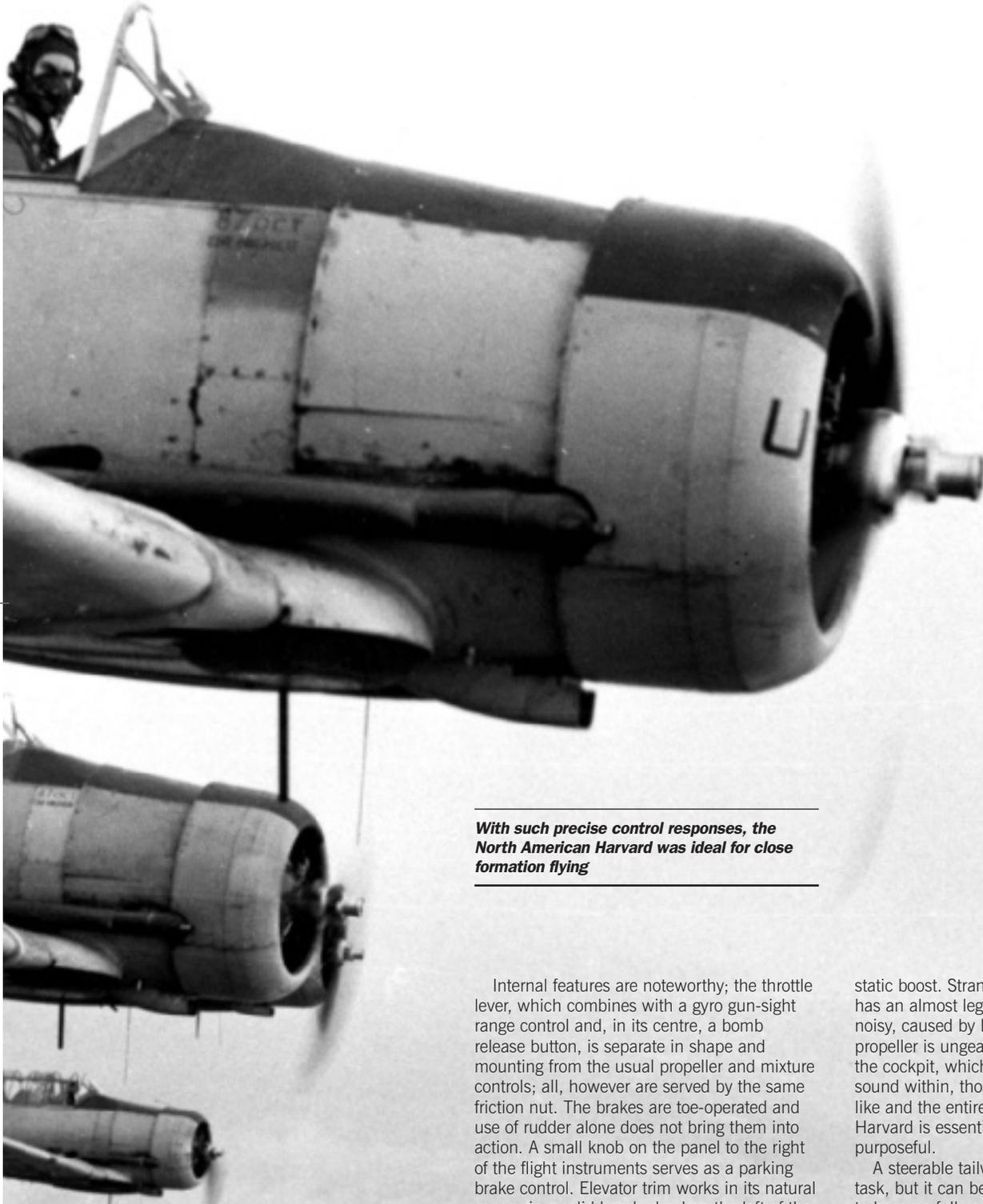
overpowering to a student who faces it for the first time. The impression is increased by the bluntness of the nose, which has no propeller spinner to soften the surroundings; behind all this lurks a Pratt-and-Whitney Wasp R-1340 radial engine that develop 550 bhp at peak, so we are considering an aeroplane with more than four times the power of the Tiger Moth from which many of the trainees had progressed.

There are too many checks to mention here in detail, but some points are interesting. Fuel lives in a pair of wing tanks each of 42 gals capacity; these are fed via a four-position cock (one for reserve from a standpipe), and the engine-driven supply can be encouraged or augmented by energetic use of a hand-pump on the port side of the cockpit. This and the starter switch make the operation of getting the engine into active business more a pastime for a PT instructor than a pupil pilot. After the usual priming and hand-turning processes, the

ignition is turned to both magnetos; then the starter is held down to energise the inertia starter until the rising hum settles on a steady note, when the switch is held momentarily in the central (off) position before it is raised to engage the starter. A generous supply of hands may be needed during this phase, as one on

*The North American Harvard was one of the best and most successful advanced trainers, says **David Ogilvy** – one of thousands whose skills were polished on the type*

Photos: mostly via Philip Jarrett



With such precise control responses, the North American Harvard was ideal for close formation flying

Internal features are noteworthy; the throttle lever, which combines with a gyro gun-sight range control and, in its centre, a bomb release button, is separate in shape and mounting from the usual propeller and mixture controls; all, however are served by the same friction nut. The brakes are toe-operated and use of rudder alone does not bring them into action. A small knob on the panel to the right of the flight instruments serves as a parking brake control. Elevator trim works in its natural sense via a solid hand-wheel on the left of the cockpit, but immediately alongside is the rudder trim wheel which is less logical and is wound forward to apply right trim. A sensible feature on each wheel is a notch, which shows neutral when the notch is vertical.

The engine may be tested after a warming period leading to at least 40°C oil and 120°C cylinder head temperatures. The constant-speed unit is checked through its full range at -2½lbs boost and the rpm drop is tested from

static boost. Strangely, although the Harvard has an almost legendary reputation for being noisy, caused by high propeller tip speeds (the propeller is ungeared) this is inaudible from the cockpit, which is relatively quiet. The sound within, though, is deep and business-like and the entire atmosphere created by the Harvard is essentially both military and purposeful.

A steerable tailwheel helps in the taxiing task, but it can be kicked out of this condition to become fully castering for manoeuvring in confined spaces. The process is easy enough when one becomes accustomed to the use of toe brakes. For take-off the elevator trim is wound slightly back from neutral (an unusual setting) and the other wheel is wound fully forward to give maximum right rudder trim.

The take-off itself is relatively event-free. Despite the 550 horses, initial acceleration is not noteworthy and there is, for example, less of a "kick in the back" than from the later

the switch, one near the throttle, another available for possible priming and yet another for use on the fuel hand pump (not forgetting that at all such times it is good airmanship practice to hold the stick back) keeps the would-be pilot fairly fully occupied before he can have any hope of getting airborne.

piston Provost of similar power. If left alone the Harvard will swing to the left, but the rudder is effective and keeping straight (if into wind) should present little problem; the machine can be lifted-off cleanly at about 70 knots IAS and allowed to accelerate to at least 100 for the sustained climb at $+1\frac{1}{2}/2200$ in rich mixture. The angle is not steep, the view is reasonable and the machine is a delight to fly with respectably responsive ailerons. The handbook credits the 2b with a rate of climb of 1,350fpm.

I have met pupils who were frightened by the Harvard, but have not heard of anyone who actually disliked it. In a pilot's aeroplane (and the Harvard is one) control feel and response must play leading roles in an overall assessment of the machine's worth; here there is no disappointment. It is human nature to head the priority list with the ailerons and these are very pleasant throughout the speed range, combining a solid feel with lightness and rapid response for a relatively small control displacement. The elevator is a little heavier and the rudder more so but the differences are minimal and, when related to the amount of movement normally needed, the result is nicely balanced.

After climbing to a sensible height, slow-speed handling should come first in any type check. Again the Harvard behaves as it should, for it handles positively down to the stall, which is preceded by a very mild dose of elevator buffeting. With everything up and power off, the breakaway occurs at about 60 knots IAS. As should be the case on a good traditional-style trainer, everything happens decisively; when the nose drops, either wing may do so with equal rapidity, so it is not possible to cheat by pre-judging which foot to use. If a pupil should hesitate and fail to release the stick back-pressure the inevitable occurs quickly and the next move is to recover from a spin, the first turn or two of which is



Top: the Mk 1 Harvard's tube steel and fabric soon gave way to monocoque metal
Above right: the Pratt & Whitney Wasp radial developed 550hp at peak
Right: RAF Harvards came with British instruments and control column

relatively rough. However, suddenly the spin becomes smoother and rudder-pause-stick does the trick, although rotation rate increases momentarily as soon as recovery rudder is applied.

British supercharged aero engines were fitted with automatic boost controls from an early stage in development, but no such refinement was to be found on American products; so it is possible to overboost the Wasp with careless throttle/rpm combinations or, for example, in a rapid dive when the boost increases as height is lost. This calls for some sense and sensitivity in engine handling, which is good.

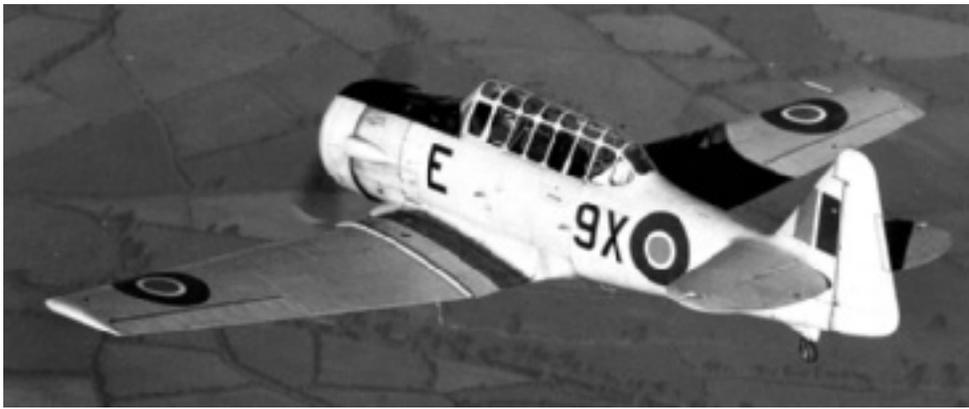
In normal cruise the Harvard purrs pleasantly at a good choice of speeds. For maximum range, 110 knots IAS is recommended and, at -2lbs boost, it may be possible to achieve this with as few as 1400 rpm. Fuel consumption varies very noticeably with different power combinations, for at this setting it is only 18 gallons per hour, whereas at 2250/+3 the thirst jumps to 56gph. In the latter case, the manual mixture control is left (back) in fully rich, but for most cruise conditions the lever can be moved forward to a position level with or just behind the throttle.



Aerobatic qualities are important features on a pilot trainer and the Service has always appreciated the value of teaching every pupil to handle an aeroplane in a wide variety of attitudes; even today, when a pilot tends to specialise and may spend the whole of his life on heavy transport or maritime reconnaissance duties, he gains confidence and competence in the basic training stage by being happy with an aeroplane when near its limits. Here the

Harvard excelled, for it looped and rolled with precision, but it reacted violently to ham hands or heavy hooves, flicking out of a loop that was pulled too tight and even spinning fairly readily from an overzealous steep turn. It manoeuvred from full-size speeds, for it sought nearly 200 knots (230 mph) for a roll-off-the-top.

Any trainer must spend much of its career on circuit work and the Harvard was happy here, too. As tail-wheel piston types required



more pilot skill and competence in the take-off and landing phases than do their jet-powered successors, FTS circuits of the forties were busy places and tended to make most of today's airfields appear almost disused. Fortunately the view from the front cockpit, positioned fairly well forward in relation to the wing leading edge, enabled the pupil to see well in all directions; the instructor's range of vision, from his position just behind the trailing edge, made his head and eyes work hard to ensure a safe passage.

Any flap position could be selected; the power-driven hydraulic system worked quite rapidly as the selector was moved in the desired direction and then placed in the central (locked) position when the required setting was established; flaps could be lowered at speeds below 110 knots and caused a noticeable nosedown trim change. Undercarriage lowering, though, had little comparable effect.

In the approach stage the Harvard offered all the feel and solidity of a larger aeroplane. An unusual feature was the propeller setting, for instead of moving the lever fully forward to obtain the fully fine position; it was selected to give 2,000 rpm, which was about 250 short of the maximum available. Recommended over-the-fence speeds ranged from 70 knots for everything down and power on, to 85 for the flaps-up glide.

Three-pointers were satisfying exercises; in normal conditions a firm touch-down in this attitude, with constant stick back-pressure when on the ground, helped to maintain a

Top: the Harvard's fuel consumption in flight varies from 18gph to 56gph

Above: of some 17,000 Harvards built, 24 remain on the UK register

Right: AOPA corporate member at Goodwood offers flight on type

load on the tailwheel and this helped it to be effectively more steerable. In rough or cross-wind conditions, though, many people strongly recommended "wheelers," for once down, the Harvard had a determined will of its own; normally it would decelerate steadily on a reasonably straight path, but occasionally it would bite hard, when full rudder in the tail-down attitude needed considerable help from the appropriate brake. Sometimes, even with everything fully applied, a swing would really set itself into business and ground loops were not uncommon. A wing lift on the landing run was not unknown, especially with flaps fully lowered.

Just as the propeller lever was not put into fully fine for the approach, nor was the throttle fully opened for a normal overshoot. If started from a relatively early stage in the arrival process, 0lbs boost should be selected but, if more power was required, such as on a late-stage decision with full flap and little airfield ahead, it was necessary to move the propeller control fully forward before opening the throttle to give +3lbs. In this power condition, even with flaps fully extended (reasonable height was needed before they could be raised safely, even in stages) the climb capacity was creditable, but

the type's characteristic crispness disappeared and everything felt rather woolly.

This must be one of the very best advanced trainers of all time. Prospective Hurricane and Spitfire pilots were given back-seat experience in it to accustom them to coping with poor forward view, while many hundreds of Lancaster pilots, too, learnt the flying art on the Harvard. According to plan, those destined for "multis" would train on Oxfords but often this failed to happen; for a time, in fact, the Oxford left the advanced training scene (to return a few years later) and all pupils graduated at wings standard on Harvards, while some, notably in Canada, started flying from scratch on the type. To anyone without previous experience on an elementary trainer the Harvard must have been a handful. Even to the thousands of us who passed to it after EFTS experience on Tiger Moths or Magisters, it seemed a big, powerful brute, but it was a machine that most trainees liked and all respected.

Here we have an aeroplane that covered a broad range of activities. In addition to the more usual handling aspects, by day and by night, those of us who trained on it gained initial experience in 'attacking' colleagues with the use of camera guns and enjoying dive (called steep glide) bombing, for which up to eight 11lb smoke bombs could be carried externally under the wings. With such precise control responses, the type was ideal for close formation flying. We were all very young and these exercises provided added incentives to complete the course and qualify as Service pilots.

In 1955 the Harvard was phased out of training for the regular air force, but it continued in service with University Air Squadrons and was used operationally against the Mau Mau in Kenya and terrorists in Malaya. Other nations retained the type for several more years and the last Service to use



it in worthwhile numbers was the South African Air Force.

The Harvard is a rugged piece of kit and, despite the long period of retirement, many have survived throughout the world. There are 24 on the UK Civil Register and others fly on the 'N' list. It is a well-loved but expensive-to-operate possession for an owner who seeks a mount with a bit of bite and in some quarters it is known as 'the poor man's (sic) Spitfire'. A few are commercially operated for pleasure/instructional flights; AOPA corporate members at Goodwood and Shoreham are among the organisations that provide this facility and any pilot who would appreciate a new experience with a bit of power at his or her fingertips, is unlikely to be disappointed. ■