NEW AMERICAN TRANSPORTS

—*and United States Reactions to the Comets*

IT is safe to say that twelve months ago no one would have believed—much less have predicted—the existence of the present unhappy circumstances in which jet transports find themselves. To be precise, one airline man did tell us in Australia that "as soon as he saw the specification he knew the Comets were no good and would break up in the air," and he went on to say that "any jetliner weighing less than 200,000 lb and carrying a payload over a useful stage length would also fail. . . ."

The events of the last week or two make it likely that B.O.A.C.'s Comet 1s, now being used for exhaustive tests, will see no more service. On the other hand, the future of the 2s and the prototype 3—now ready to fly—are a different matter. And then there is the Boeing 707, which the Editor was privileged to examine in advance of its public appearance. Almost unbelievably it subsided on to its port-side pods during recent taxying trials and suffered quite serious damage. What this may mean in terms of undercarriage restressing or redesign we have yet to learn. Insurance claims are expected to amount to nearly $\$\frac{1}{4}$m, excluding any damage to engines which were not held covered. Certainly the company has suffered a most unfortunate reverse.

The friendly American sentiments regarding the Comet, recognized in our leader of April 23rd, were in fact manifest to the Editor during visits a month ago to the Douglas, Lockheed and Boeing plants. Talking to the designers, top engineers and to airline men in America as well, everywhere he met with sympathetic understanding and no suggestion of making capital out of the Comet setback.

The makers themselves were quick to point out that the DC-6 and Constellation both suffered long, expensive and worrying periods of grounding earlier in their careers. They indicated that one company's troubles, even if it is a rival, are their close concern too. They said that any help they could give would be freely forthcoming and they added their hope that an early answer would be found. There were no doubts as to the sincerity of these expressions of good will.

Many in Britain may be interested to learn that the publicity given to the second Rome disaster was restrained in America. One of the American companies told the Editor in confidence that it had gone so far as to set up a top-level committee of its own to study all information in case some possible solutions suggest themselves in the light of that company's immense experience of transport aircraft. In view of subsequent statements in the Press and the offer of help which has been made there can be no harm in mentioning now that this was the Douglas Company. The view was also expressed that the Comet mystery may have delayed Douglas's own plans by perhaps three months.

Naturally there was much surmise over there as to the cause or causes of the Comet troubles. Sabotage was scarcely considered. Engines—turbines to be precise—dropped from 50 per cent to no more than 10 per cent after the second loss. Kerosine explosion from one of several possible causes is high on the list and was being closely discussed. The belief that the centre section tank is of bag type—and all bags eventually suffer from seepage—has given this possibility prominence.

Again, the integral wing tanks are starting to have some clear air space at 25,000ft and the kerosine cools only slowly, and thus, it is pointed out, outside air temperature bears little relationship to the temperature of vapour at low pressure in the tanks. The envelope on a pressure temperature chart for kerosine shows the possibility of explosion at these sort of heights. American manufacturers, while appreciating calorific advantages of kerosine are as yet doubtful about its use in commercial aircraft. Military aircraft usually have an inert gas passed into tanks as they empty. The B-47, for example, has dry ice (solid CO_2) containers at the rear end of fuselage; around them are electric blankets which cause CO_2 discharge into the tanks when switched on as fuel is used.

What could cause a spark to set off an explosion? American engineers have considered electrical equipment as No. 1 possible cause—they believe the Comet's electrics might be at fault and stress the tremendous time and trouble they have had to spend on their own electrical systems with full isolation and safety in mind.

Another possibility is static. They wonder about Redux bonding of spanwise stringers in proximity to wing tanks. Apart from possible fuel vapour explosion, what is the effect of static or lightning discharge across Redux joints—could this have a bearing on the Calcutta accident, if not others? Finally, in view of past history of fuel-in-the-wing fires and explosions, and kerosine's ability to creep, can this be occurring or can fuel be overflowing during pressure re-fuelling in spite of checks and inspections? If this can happen, then some Americans think that buried engines also become a special danger.

Insufficient is known about tail and other structures for opinions to be expressed about their possible influence on the problem.

It may be added that the big manufacturers express little surprise that the troubles should have occurred after nearly two years' successful operation. Their experience has led them to expect troubles at various times well into the career of an aircraft after everything has thoroughly shaken down.

Another matter of which the Americans are obviously suspicious is the control system. Lack of manual (cable or rod) emergency system is thought wrong on a commercial aircraft and the type of feel and feed-back system is not favoured. It seems probable that like the Boeing 707 other American transports will have all-manual controls or have a manual alternative—even the B-52 bomber has manual controls with ordinary spring tabs. Strangely enough not much was said in the pod versus root controversy, nor was it held to be very important.

America's Plans and Progress

Now what of the plans and progress of the Boeing big three? There is no doubt that the 550 m.p.h. Boeing 707 has set Douglas and Lockheed a tremendous problem. There it is, an attractive and undoubtedly efficient prototype which was until the landing-gear mishap, ready to fly in a week's time. Nominally aimed at the military tanker market it is as well perhaps as much as 90 per cent civil airliner at the same time. It is said in America that physics control design just as much as civil or military duty these days.

In California some small comfort is being derived from past history which seems to show that those who waited a little longer and produced a slightly more efficient aircraft came out best in the end, and that a military prototype has in the past resulted in certain disadvantages in the civil derivative. The Boeing 247, earlier Stratoliner and Stratocruiser all came first, but were overhauled by DC-3, DC-4, Connie and DC-6. But Boeing should be wiser and more experienced today, so who can say that Douglas or Lockheed, starting later, can do better in the civil field. For the record let's add that taking into consideration the military orders for Stratocruisers (KC-97s), Boeing producing at the rate of one a day are ahead of all others in the class with a total of perhaps 550 to 600 built. Douglas DC-6 series (including 7s) are a close second, with just over 500 completed, and Lockheed Constellations not so far behind at third.

Above we state "Douglas *or* Lockheed can do better." It was intentional that the word "and" was not used. A small sum indicating probable total requirements of jet transports and the cost in America to design, develop and produce them, seems to indicate that if all three have a go, some one or even two are bound to burn their fingers—and this is discounting the competition of the 500 m.p.h. Comet 3 and the Vickers 1000.

Will there be much difference between the American three if they are all built? The answer must be no, for all will of necessity use four P. and W. J57s of 11,000 to 12,000 lb thrust. They will all have to be non-stop trans-Continental aircraft, and on the North Atlantic, non-stop one way and most of the time both ways. Capacity will also be much the same as requested by the airlines who are potential buyers. Six or seven years ago Douglas, it is learned, took a 500 m.p.h. jet transport design to show to several operators but received such a rough verbal handling that they hurriedly shelved it. Now the approach has come from the operators who want to talk of at least 550 m.p.h. for cruising.

In passing let us not overlook the big military turboprop transports for which a very important civil market may be found in the future—the Lockheed C-130, and the Douglas C-124 conversion and now the huge newly announced C-133. At present the makers are somewhat suspicious of their turboprop engines—with some justification no doubt—but feel that military requirements will bring about, and pay for, the development of good reliable American units in the near future.

Both Lockheed and Douglas have four-jet transport designs—worked out in considerable detail in each case, and with several variants. Any one would be ready on the word go. Both companies feel, however, that to discontinue their present aircraft (which are highly successful and make money for their operators) too early would be at least as bad as to start a bit late on the next ones.

Jet competition alone is to be feared and D.H., Boeing and later Vickers will try to give it. Because the Douglas DC-7 is in many quarters accepted as the best of the big compounded piston-engine transports at this time, Lockheed (who have also

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