

to permit its use on a large scale. Airships are, in fact, obsolete. Like the monsters of prehistoric times, they are too ponderous and clumsy to survive. A few specimens may still linger on before they disappear, but they can never compete with carriage by rail and road and sea.

What then is the sum of the whole matter? There is no large and growing future for commercial aviation, because the future will never be much more than the present. There is a place for short-range traffic in planes to carry mails and those few passengers whom necessity impels to save time at the expense of comfort. But their number is not great. Recent sensational achievements in aviation have blinded its exponents to the inevitable obstacles. The feats of heroism and endurance performed in long oceanic flights are merely a token of the stern limitations which beset them. "Thou hast placed bounds upon them which they shall not pass."

The devotees of new instruments can never see anything else. The princes of the power of the air wax sarcastic over what they call "the Noah's Ark school" of transport. But the Ark could carry a considerable freight and bore it in safety. Noah used flight merely as an auxiliary to sea transport, and that is all it is good for.



II — FACING AVIATION'S CRITICS

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WHEN a boxer rushes in with swinging arms, he may rain blows upon his opponent, but he leaves his midriff open to some heavy wallops from the enemy. Aviation is like such a boxer in that it is plunging gaily ahead just now with little attention to the body blows many competent critics are aiming at its midriff.

I think there are two reasons for this. First, we Americans are so enthusiastic when once we get started that occasionally our emotion runs away with our common sense. We are in a seventh heaven of self-esteem over this thrilling matter of human flight

which the Wrights — our countrymen — have made possible. Again, being an imaginative people, we cannot resist the temptation to speculate extravagantly about the future of aviation. And once our mental pictures have become clear enough, we begin to feel that they are realities. Hence the catchwords of the day: "air age," "giant air liner," "birdman," "ocean air service," "air flivver." All may come; but they are not here yet — and just talking about them can't bring them.

Probably the strongest argument wielded by critics of aviation is that which defines the limits of flying from the viewpoint of the railway and automobile. A common formula is this: "The railway and the automobile outgrew the period of danger to their passengers. Therefore, if flying is ever to replace them, it must likewise emerge from its present hazards."

It is true that in 1845 the railway was viewed much as the layman looks on flying to-day — as a short cut to suicide. By 1895 it was widely used, though still a thorn in the side of civilization. Now railways no longer advertise on the basis of safety, but of luxury. It is true that in 1900 the horseless carriage was thought a futile experiment; and that by 1910 automobile races were a public scandal in the deaths they caused; and that by 1928 — though we still kill about 30,000 people and injure around 800,000 — the motor car is accepted as a safe conveyance for women and children as well as racing drivers.

It is likewise true that men have known how to fly for twenty-five years, and that there has been no miraculous progress in safety of flying. The percentage of deaths is still higher than it ought to be. But to point the future of the airplane by analogy to the railway and automobile is as futile as comparing the telephone with radio. One has only to turn to the files of old newspapers to find the railway and motor car condemned by the same faulty logic.

For instance: "The railway cannot succeed (this was 1839) because of two definite shortcomings: first, it cannot go uphill; and second, not enough people want to go somewhere in a hurry to make it pay." The American citizen of 1839 did not picture the gigantic engineering machinery that would make it possible to build our transcontinental roadbeds with only slight grades, nor the tumultuous rush of twentieth century existence that necessitates high-speed transportation.

In the same way, early critics could see no future for the automobile. "The automobile cannot possibly succeed (this was 1897)

because of two inherent defects: first, its engine will always be so unreliable that the average citizen will not tolerate the delay and inconvenience sure to arise; and second, there will never be sufficient funds to build level roads permitting travel at high speed." The American of 1897 did not foresee an automobile tire that would last for 20,000 miles, an engine that would go 150,000 miles, nor a public opinion that would support a budget of \$200,000,000 for good roads.

It is an interesting sidelight on this discussion that for a hundred years the same sort of arguments were employed against the use of dogs in arctic travel. Some said: "The dog is a good draft animal, but he must be fed. When he starts out on a journey of one hundred days, he must haul one hundred rations of food for himself. Such a load leaves no room for the food, clothing, and equipment of the explorer." As a result, every man-hauled expedition toward the poles of the earth failed. Peary and Amundsen succeeded and reached the North and South Poles respectively by using dogs for draught animals.

In each instance I have cited, the fallacy of the arguments was the same. Opponents of dog teams were arguing from the point of view of man teams. Later, opponents of railways argued from the point of view of prairie schooners; and those against automobiles from the point of view of railways. However, it is not profitable to meet critics of aviation simply by declaring that their arguments are behind the times. Some of them are in advance of the opinions held by the very men who defend flying with all their might and main.

The average pilot gives little thought to the fact that a plane's capacity cannot be increased in the same proportion as that of a ship by increasing its size. By the law of cubes, one ship twice as large as another can carry eight times as much. A freight car of fifty tons capacity can carry four hundred tons if its dimensions be doubled. A plane doubled in size cannot carry even twice as much for two reasons: its power load, or weight per horsepower, cannot be increased beyond a definite limit, and its wing structure is not quite so efficient when increased in size.

It may seem, therefore, that the plane can never compete with the ship or train as a carrier of passengers or freight. Possibly so. But I submit that here again we are arguing by false analogy.

Consider the telegraph. When Morse first gave the world his incredibly swift transmission of messages, one could have argued:

"But the wire can carry only one letter of one word at a time. And even at high speed the words cannot pile up into so much as one book for days. Moreover, the slender metal thread upon which we are asked to pin our faith may be broken by wind or snow, or by its own weight. Indeed, what is the sense of such rapid transmission of language, save in a few emergencies?"

What happened? Multiplex telegraphy. Strong wires. Mechanical transmission. The whole world speeded up to the point where wired communication was the shuttle that wove the pattern of a world's very existence. Ships still bring us ponderous bags of mail and documentary records. All the old arguments in support of ship-borne manuscript still hold, but the method itself has taken second place in the vital happenings of the day.

With a great show of concern the critic of flying points to the fact that we are building smaller planes to-day than we were ten years ago; that the progress in performance of planes — speed, cruising radius, fuel, efficiency — can increase only slightly more.

As a great believer in aviation I am one of the first to admit this. The Navy's NC-4, which crossed the Atlantic by air in 1921, was about twice the size of the "America," in which I flew to France in 1927. The giant Barling bomber was nearly three times the size of my plane. I think it is fair to say that both these designs are now out of date.

As for performance, not long ago the General Board of the Navy reported to its Secretary: *"Increase of performance may be obtained by engine development, adaptation of lighter materials to construction, some possible improvements in aerodynamical characteristics such as wing surfaces, stream lines, balance, control, etc. But an increase beyond 30% cannot be foreseen as within human accomplishment with materials and mechanisms so far known."*

This seems to seal the death warrant of aviation progress, doesn't it? At least when one argues that planes must be built bigger and bigger, and go indefinitely faster and faster, unless aviation is to be judged a failure. But how about the fact that we have over 22,000,000 automobiles in the country to-day and that the great majority of them are *smaller* than the average passenger car of ten years ago?

The truth is that the very heavy and ponderous motor car was found more extravagant and less efficient than the moderately light car. Both city and suburban life, as well as roadways, became adapted to the lighter car. Bigger trains and steamships

were built in the corresponding period. Yet it cannot be said that the automobile industry retrograded because the cubic contents of its cars declined.

American aviation suffers much for not keeping pace with that of Europe. German and British airways carry many thousands of passengers every month. Why cannot we do so? The answer is that European airways are heavily subsidized by the government. "Ah," says flying's critic, "we here uncover another defect in aviation. It can never pay its way!"

As a matter of fact, this very point is a fine feather in the cap of the American business man. He is of fighting stock that does not tolerate paternalism.

"All right," said an airplane manufacturer the other day, "if our passenger and mail planes can't run at a profit, let's don't have 'em!"

He could well afford to make such a statement because he knew that at least half a dozen new passenger lines are going into commission this year between the big cities of the East, and that more and more private contractors are taking over government air mail contracts. Neither one is out to live on subsidy; both are already beginning to pay.

It is more difficult to uphold the case of the airship — that is, the lighter-than-air dirigible — than it is that of the plane. The dirigible is still in its swaddling clothes. But here we have something more nearly like the steamship on which to base our arguments.

The first steamship to cross the Atlantic was the "Savannah," of 350 tons. She left Savannah, Georgia, on May 24, 1819, and reached Liverpool twenty-six days later, during eighteen of which she used her side paddles. Compare the helplessness of that panting hulk of 1819 with the trim seaworthiness of a contemporary sailing vessel. Compare her twenty-six days with the twelve-day record of a clipper "Dreadnaught" which made that time by sail alone. Compare the "Savannah's" cramped size and difficulty of handling with any average windjammer of her time, and see what chance her advocates had of getting away with a prophecy that some day a steam liner of 60,000 tons would be built and would cross to England in four days. "Fanatic" would have been the only proper term for so unbalanced a devotee of steam on the high seas.

"Fanatic" they call us to-day for warmly supporting aviation.

The art of flying has been much hurt by air enthusiasts, I admit. There have been too many predictions that have not yet come true. That is why many of us try hard to steer a middle course. But for all my conservatism I am confident that flying has a future as yet undreamed of, and that in a few years these hot blasts now issuing against it will read as foolishly as do the original arguments against the railway and the automobile.

Though I look for no immediate spectacular advance in flying, I do believe that design will be slowly improved, performance enlarged, and safety increased every year. Only the other day there was announced in England an item of design in the form of wing slots that would automatically prevent a plane from going into a tail spin. There may be devised a means of lightening a plane's load automatically in case one of its several engines stalls. And so on.

Performance is a more complex matter, because it takes into account speed, cruising radius, and maneuverability. Commercial planes now usually work at speeds of from sixty to ninety miles an hour. In a year these limits should be from one hundred ten to one hundred fifty miles an hour. Probably two hundred miles an hour will be the limit in a few years. Cruising radius will be increased when fuel consumption is improved and structural weight reduced. Both are going on in a small way every day.

Maneuverability is something we know relatively little about. But there are being held important tests in nearly all aircraft plants and in our military service that will make planes more docile in the air and safer in taking off and landing.

I think the so-called "flivver," or small private plane, is practical to-day and will soon be built in quantities at a cost of from \$1000 to \$2000. The popular size will carry two or three passengers and be built for safety rather than for speed.

The greatest progress — and the development that will mean most to aviation — must come from banking support. So far this support has been very limited, but it is increasing markedly as more successful flying is done. When American business joins hands with American aviation, the future of flying is assured.





IN the bush up in the Peace River country he was known as "Old Lonely." Not many people even in Peace River Crossing knew more than that. A few knew that his first name was Gabe. Somebody asked him one time if that stood for Gabriel. He studied his questioner a moment as though he thought there was a hidden meaning to the inquiry.

"No," he said quietly at last, "it don't stand for nothin'. That's jest my name — Gabe."

He was one of the old-timers. Nobody remembers any more who most of the others were. They were just prospectors and traders and trappers, just vagabonds whose outstanding characteristic was curiosity — curiosity about what lay over the next sky line, about the way Chinook sneaked in through the hills unexpectedly on wild winter nights, about beaver dams and northern lights and trees and creeks and living things. They were strange men, all of them — restless, forever wandering. But