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## The Safe and Useful Aeroplane

AN INTERVIEW WITH ORVILLE WRIGHT

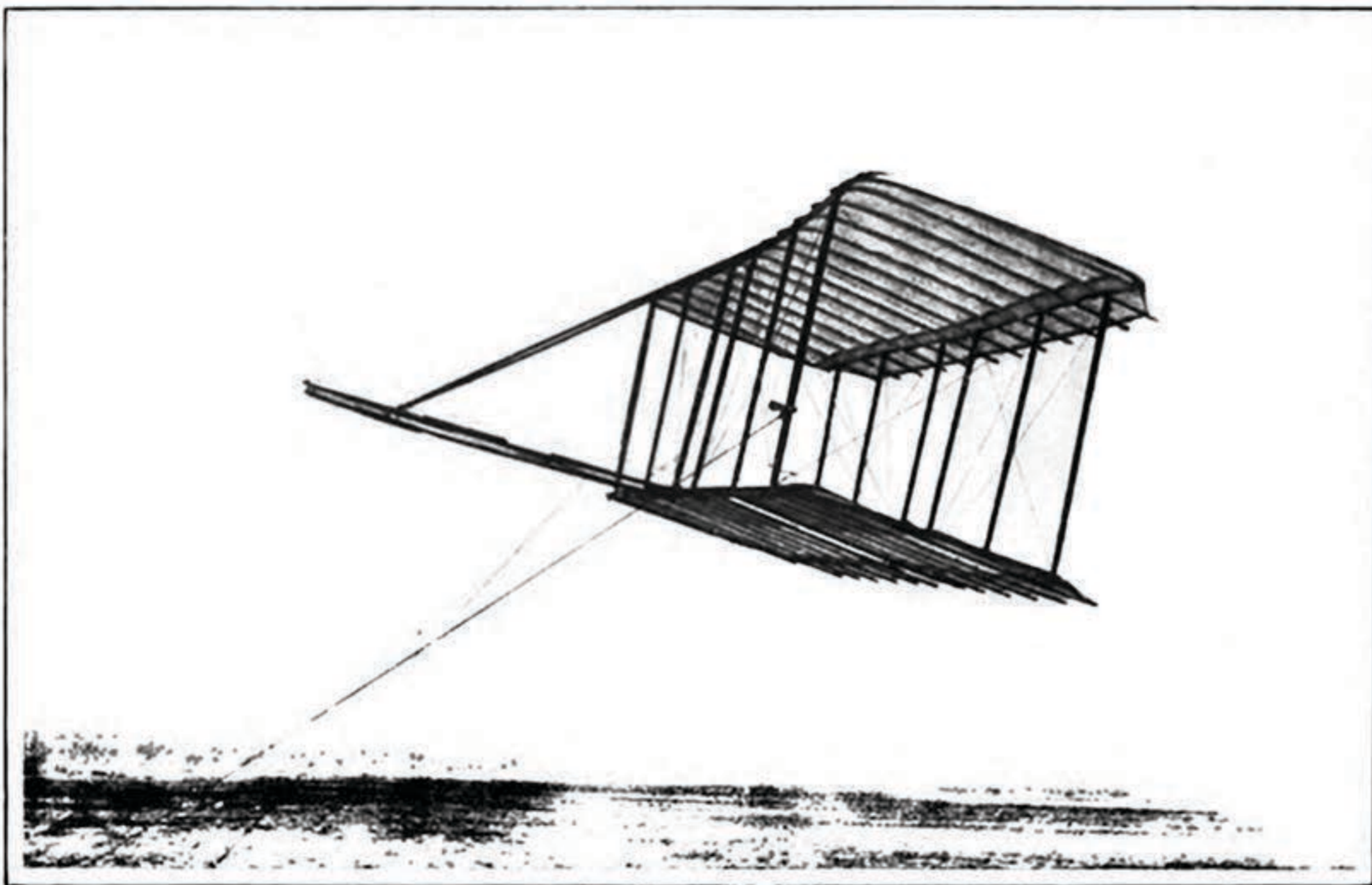
BY BURTON J. HENDRICK



WHILE the world is thundering with well-nigh universal war, the one man whose life-work has probably most influenced most military operations is spending his quiet days experimenting in his laboratory at Dayton, Ohio. This is Orville Wright, the man who, with his brother Wilbur, invented the aeroplane. It was only about ten years ago that Wilbur Wright, in France, and Orville Wright, in this country, made the famous flights that first brought home to the world the fact that transportation through the air had become a reality. The last three years have shown the part that this invention was to play in history. Yet when I recently talked with Mr. Orville Wright on the aeroplane, I found him more interested in its usefulness as an instrument of peace than as an instrument of war.

"I really believe," he said, "that the aeroplane will help peace in more ways than one—in particular I think it will have a tendency to make war impossible. Indeed, it is my conviction that, had the European governments foreseen the part which the aeroplane was to play, especially in reducing all their strategical plans to a devastating deadlock, they would never have entered upon the war. Possibly they foresaw something of the present development, but not definitely. When I was in England several years ago

I found the British Government not at all enthusiastic about the aeroplane, since the English military experts regarded it as a menace to England's isolation. This was the time when the nation was aroused over the fear of a German invasion; there was a widespread belief that the Germans were planning a descent in several forms of aircraft, and many very sensible people regarded such an enterprise as not impossible. Naturally they looked with suspicion upon any instrument, such as the aeroplane, which might facilitate such an operation. This illustrates the mistaken notions which were entertained concerning the practical uses of the aeroplane in warfare. Most of us saw its use for scouting purposes, but few foresaw that it would usher in an entirely new form of warfare. As a result of its activities, every opposing general knows precisely the strength of his enemy and precisely what he is going to do. Thus surprise attacks, which for thousands of years have determined the event of wars, are no longer possible, and thus all future wars, between forces which stand anywhere near an equality, will settle down to tedious deadlocks. Civilized countries, knowing this in advance, will hesitate before taking up arms—a fact which makes me believe that the aeroplane, far more than Hague conferences and Leagues to enforce peace, will exert a powerful influence in putting an end to war."



THE GLIDER OF 1899, MADE BY THE WRIGHT BROTHERS, AND FLOWN AS A KITE

"I presume you would welcome such an outcome?" I said.

"Yes, indeed," answered Mr. Wright, quickly. "I should hail this as the aeroplane's greatest triumph. My main interest is in the aeroplane as a real promoter of civilization. Recent events have made us regard it almost exclusively as a weapon of war. Probably many people believe that, as soon as peace is signed, the thousands of aeroplanes that have contributed so greatly to it will be scrapped. That is not my belief. After the war we are told we shall have a new world and a new type of civilization; in my opinion one of the factors that will contribute to this changed order will be the part which will be played in it by the aeroplane. We shall have an entirely new form of transportation, which will serve many ends and contribute in many ways to the welfare and happiness of mankind."

"Yes," I remarked, "we have many prophets who tell us of the wonderful future in store for your invention."

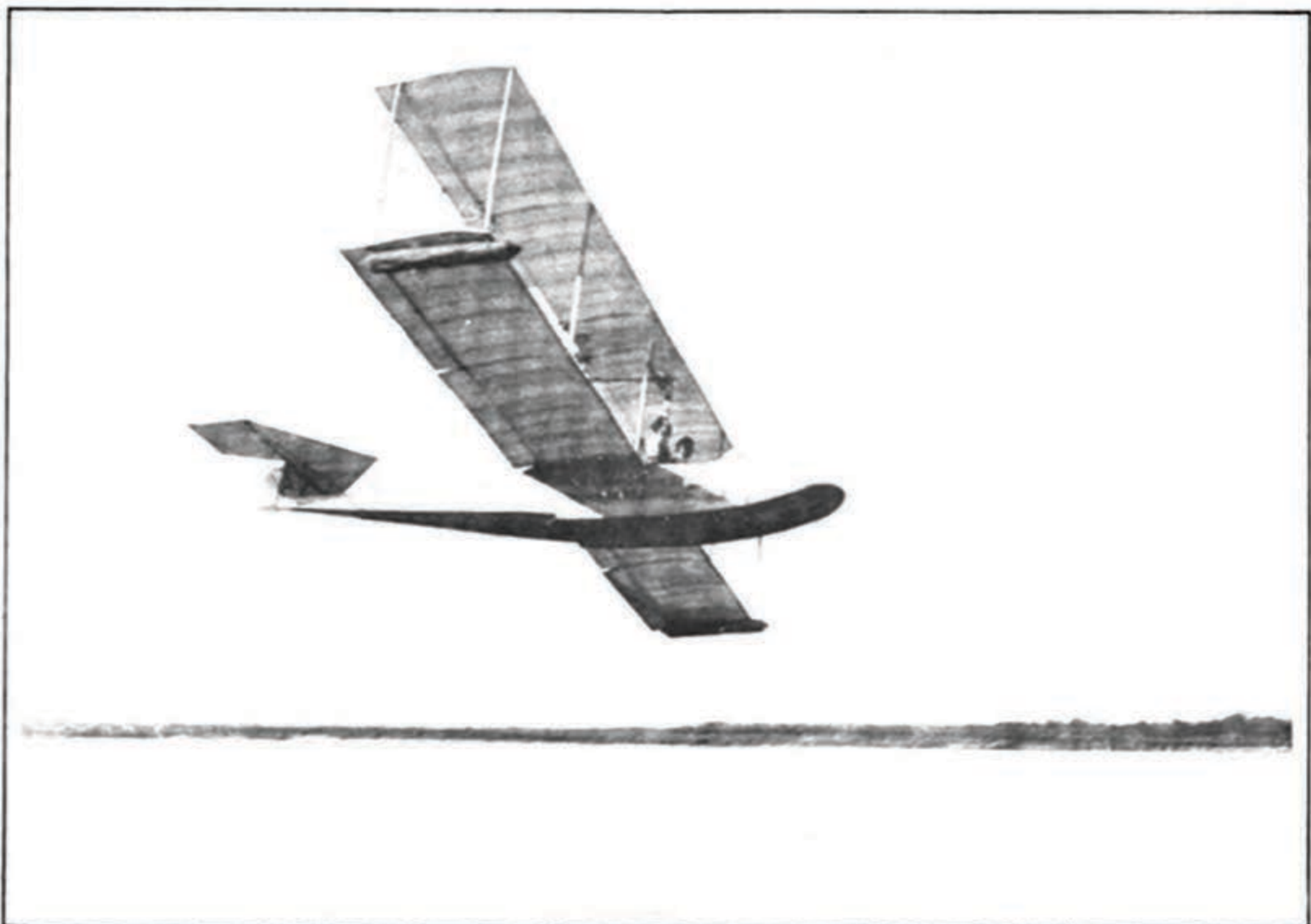
"Yet I am not one of those," answered Mr. Wright, "who entertain extravagant ideas concerning its future. All sorts of ridiculous notions are afloat, largely

fathered by people of lively imagination and of limited information. I do not believe that all transportation in future will be through the air. The aeroplane will not supplant the railroad, the trolley-car, or the automobile. All our present methods of transporting passengers and freight will continue to render excellent service; the aeroplane will merely be another agency for performing a similar kind of work. There are certain things that it will do better than the railroad or the automobile, and its use will therefore be limited to these, for we must realize at the start that the aeroplane has decided limitations. In saying this I am discussing the machine as we know it to-day. It is not impossible that other forms of aircraft, built upon other principles, may be invented, which may accomplish all the wonderful things certain imaginative people prophesy for the present aeroplane. We see numerous pictures to-day of aircraft as large as ocean-liners, but these are merely vain imaginings. We shall have no aeroplanes as large as the *Lusitania*. Any one who understands the fundamentals of air mechanics will immediately understand why this is so. The aeroplane is built essentially upon

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the same principles as a bird; it has the same flying capabilities as a bird, and precisely the same limitations. The best flyer among birds is the humming-bird. Have you ever noticed how it poises itself in the air, in almost identically the same place, perhaps for an hour at a time? The humming-bird is one of the smallest of birds; and certain insects, which are much smaller, such as the dragon-fly, are also wonderful flyers. It is a law of nature that, the larger the bird, the poorer its flying ability. The barnyard fowl has great difficulty in getting over a fence, while the ostrich does not fly at all. All creatures that live in the air are small; we have nothing, among flying animals, which can be compared in size to the horse or the elephant. There are excellent mechanical reasons for this. The main one is that, as a bird increases in size, its weight increases at a much greater rate than the area of its wings. Thus, if a bird doubles in size, it would need, to lift itself in the air, not twice as much power, but eight times as much. That is, its weight increases as its cube, whereas the area of the wings increases as its square.

You can easily see where that mathematical principle will soon land you. This is the principle that limits the size of birds, and it is also the principle that limits the size of aeroplanes, which fly just as birds fly. Each increase in size demands a much greater proportional increase in motive power, the result being that we have to add so enormously to the weight that the aeroplane soon reaches a size where it cannot leave the ground. Many attempts have been made to make bigger machines, but nothing is gained in economy or usefulness by making them. The aeroplane is a method of transportation that works best and least expensively in small units. We can get better and cheaper service out of two aeroplanes of moderate size than we can get out of one which is twice as large. There are other factors that will limit our present aeroplane practically to its present size, but it is unnecessary to go into the matter in greater detail. Ten passengers have already been carried comfortably, yet it is a fact that a large car carrying ten passengers would not be so economical or efficient as ten little cars each carrying one."

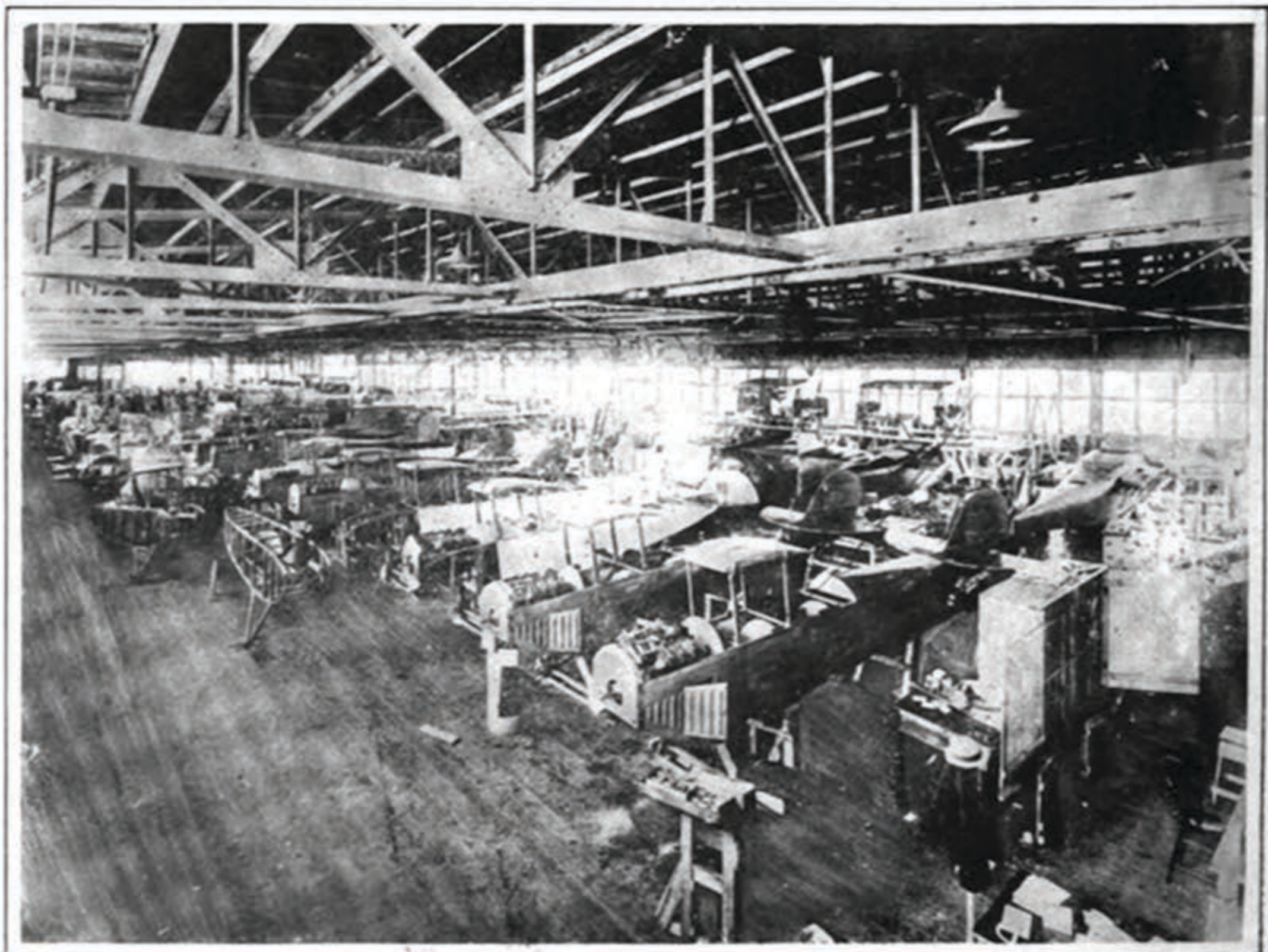


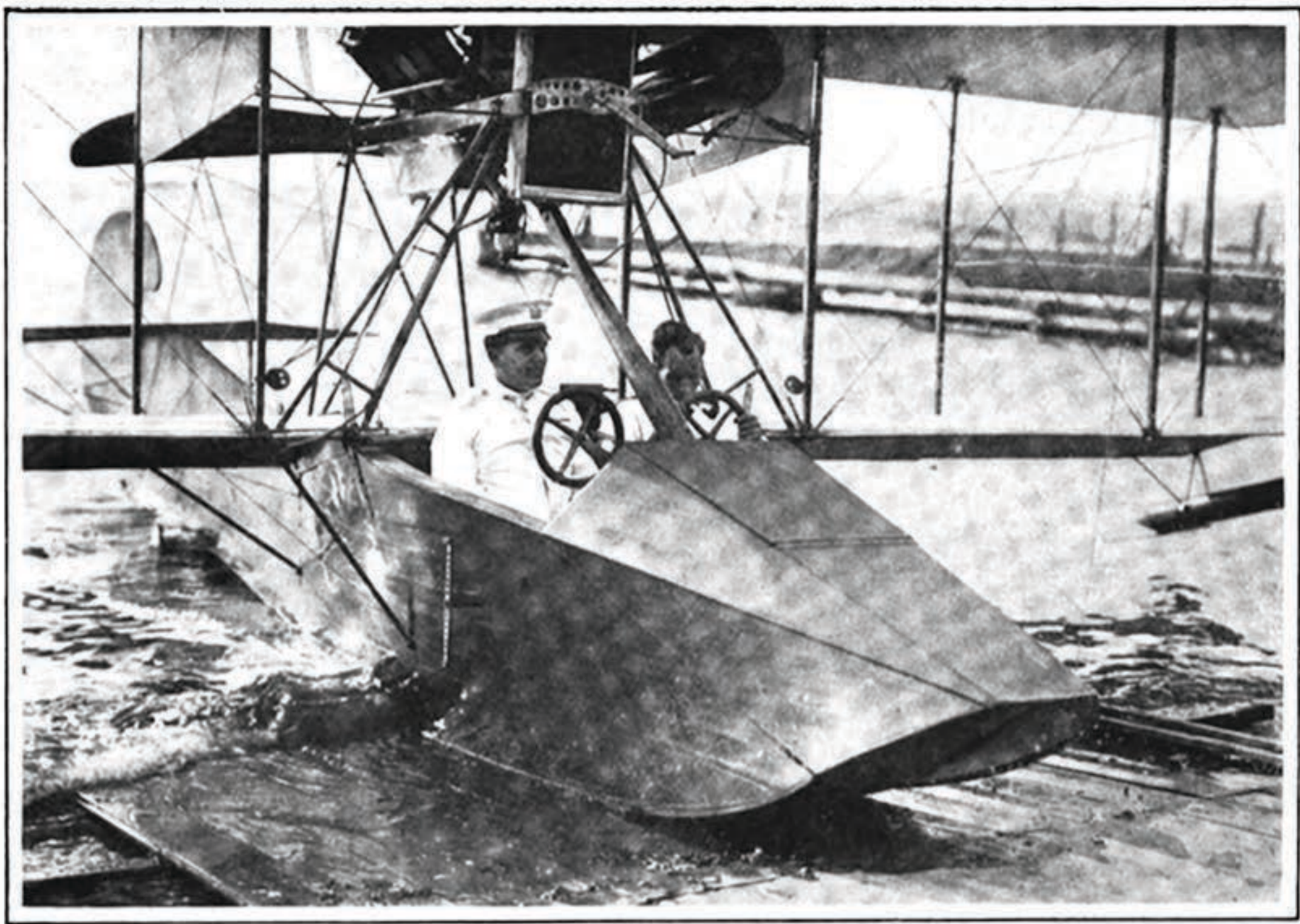
"Most people believe," I suggested, "that what mainly stands in the way of the aeroplane is its danger. The average citizen regards it as an exhilarating and exciting sport, but not safe enough for general use."

"Yes," said Mr. Wright, "it is a new idea that the aeroplane is a safe means of transportation in safe hands, yet it is an idea that we must firmly get into the popular mind. The average citizen is still frightened at the prospect of leaving the ground and having no support except the air itself. Yet at the speed which we expect an aeroplane to maintain—seventy or eighty miles an hour—there is no means of transportation that is so safe. The obstructions that cause accidents with trains and automobiles do not exist for flying craft. A locomotive has to follow a definite track, which may be obstructed or the slightest dislocation of which may cause a frightful calamity. The aeroplane is not so circumscribed—its tracks are wherever it wishes to go. There are no obstructions in the air—unless we regard 'air-pockets' as such—no bridges to

cross, no mountains to penetrate, no signals to run by, and no switches to be misplaced. Or compare this new craft to the rough road of the automobile. The slightest mistake or even inattention on the part of the driver, going, say, forty or fifty miles an hour, may hurl the machine over a precipice or overturn it on an embankment. But such a lapse on the part of an aviator has no such deplorable results; there are no precipices to fall from and no obstructions to collide with. The aeroplane is even safer than some forms of water travel. The motor-boat, going at a speed of forty miles an hour, or even slower, is a more risky form of transportation than an aeroplane. If such a boat strike even a small obstruction, such as a floating plank, its side is punctured and it sinks in a few seconds. But there are no such dangers in the air.

"Certain performers have done much to instil this notion that flying is exceedingly dangerous," Mr. Wright continued. "These are the daredevil exhibition flyers, who cultivate the circus aspects of the art. Both by words and





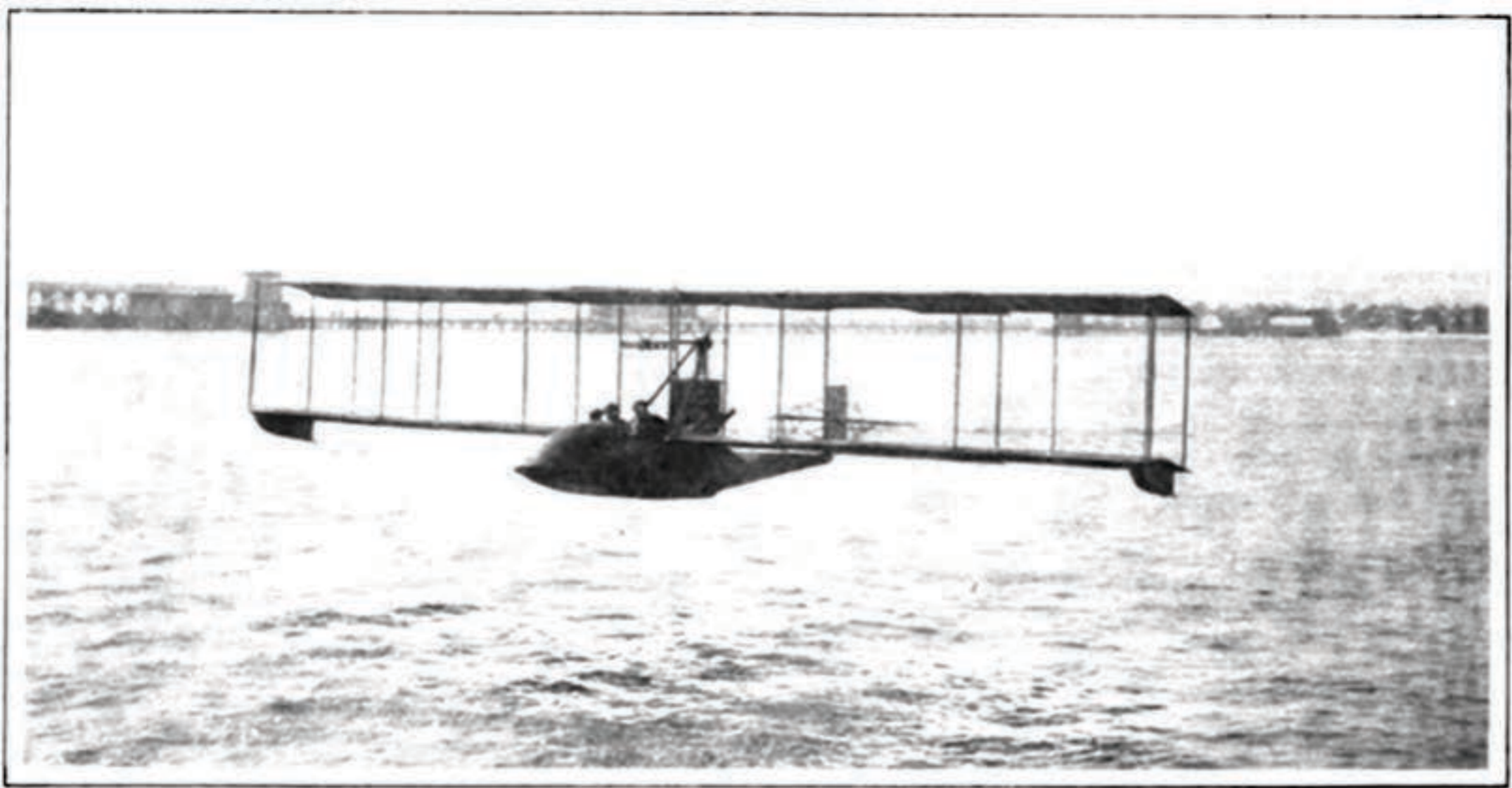
HYDROAEROPLANE, LANDING

deeds they have associated the aeroplane with the idea of danger. They have spread abroad the impression that only an immense amount of nerve, abnormal skill, and plenty of luck qualify one for aviation. And their air acrobatics—their tail-glides and their loopings—the-loop—have accentuated this idea. They have had many bad accidents, too, which have been the necessary consequences of inexperience and of taking foolish chances. Yet I do not wish to criticize too harshly these circus-performers, for they have accomplished much good. The man who first looped-the-loop made a solid contribution to the cause of aeronautics, for he demonstrated the wonderful stability and righting-power of the aeroplane. He showed that the contrivance could get into practically no position in the air from which it could not be righted. What other means of transportation, except the aeroplane, sails just as well upside as down? In what other can one turn turtle, without fear of serious consequences? We owe the demonstration of these reassuring facts to the exhibi-

tion-performers, and the discovery has the greatest value for the man or woman who prefers to fly in more prosaic fashion. It gives them a consciousness that, whatever happens, they are safe. Still these flyers, with their numerous accidents, have made the aviator's career seem a hazardous one, and of this false idea we should disabuse our minds. There is no sense of dizziness in the air. Once well up, you never know whether your elevation is a few hundred or a few thousand feet."

"Are there, then, no dangers in flying?" I asked.

"Yes, indeed," Mr. Wright answered, "but there are no difficulties which ordinary prudence and common sense cannot provide against, for the greatest danger of aeroplaning is not the flying, but the landing. If one has a wide, smooth, open place for his descent, all is well; but it is inconvenient and it may be fatal to land in the top of a tree or somewhere in the neighborhood of a skyscraper. Of actual upsetting in the air—that is, a genuine fall, such as was not infrequent in the early days—there is



OPENING ST. PETERSBURG-TAMPA AIR-BOAT LINE

now very little danger, and there is no reason why accidents of this kind should ever take place, for, as I have already said, an aeroplane, no matter what position it gets into, is easily righted. What we must guard against, above everything, is flying too near the ground. Here again we must revise the popular attitude toward the aeroplane. Most people feel that they would not mind going up provided they went up only a hundred feet or so; the idea of ascending fifteen hundred or two thousand is what appals them. But in general I may say that the higher one flies the safer he is. Clearly, if you are going to fall, you will suffer no more by falling from a thousand feet than from five hundred; the chances are that you will be killed in either case. But you are less likely to have a serious fall at the higher altitude than at the lower. The reason is that, if the machine is high enough, the pilot has space in which to right himself, while if he is too near the ground he does not have sufficient space.

“We also hear much about the stopping of the motor. The public has the impression that this dead motor is one of the greatest perils of flying. As a matter of fact, the stopping of the motor is not necessarily a serious matter. The motor does not make the aeroplane fly—it merely propels it. The machine flies when the motor stops, only it does not

fly on the horizontal plane. Whenever this happens, it glides easily and gracefully toward the earth. If we have a level landing-place under us, everything goes well; if we do not, the consequences are unpleasant. If we are only a hundred feet in the air, we haven't time to select a landing-place, but go down just where we are, whether it is a deep pond, a mass of telegraph wires, or the tangled roofs of the city. If we are up a thousand or more feet, however, we have much more room to glide in, and can usually select some place where we can land in comfort. The usual gliding range is about eight to one; that is, if the aeroplane is a hundred feet in the air, it lands about eight hundred feet away from the place where the motor stops, while if it is up a thousand feet, it comes down about eight thousand feet away, or about a mile and a half. A height of two thousand feet, giving a gliding range of three miles, is usually safe for all purposes, as, from this height, the flyer can discover a level spot within that large radius. Thus safety in the air is almost entirely a matter of maintaining a sufficient height. Exhibition-performers constantly take this risk; they persist in flying low over a city, taking their chances that the motor will not stop. I cannot understand why men will run such risks, unless it is that flight itself is so easy, and the aeroplane inspires such

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confidence, that the possibility of a mishap vanishes from the mind.

"What do you do, then, when the motor stops?" I asked.

"The stopping of the motor is not in itself dangerous," said Mr. Wright; "it merely means a descent to earth until the mechanism can be again made ready for flight. But it is inconvenient, and a deterrent to commercial aeroplaning. A motor that works with the same perfection as the automobile motor is to-day our greatest need. And we are making rapid progress toward obtaining it. This, it will be remembered, was the greatest problem of the automobile in the early days—the motor's constant tendency to break down in a distant road was a constant irritation. We have been going through this same preliminary stage with the aeroplane motor; indeed, I think we have made more progress in the same period of time in propelling the flying-machine than we did in propelling the automobile. American manufacturers are somewhat behind Europeans in making motors, simply because we have not had the opportunities to experiment. Making thousands of machines for war purposes, the European manufacturers have naturally produced

motors that are superior to ours. They have spent millions in experimental work and with satisfactory results. One motor in particular weighs only 374 pounds, has developed 150 horse-power, and has the important quality of durability. This motor has given certain war aeroplanes a speed of 125 miles an hour, and with it the aviator can climb 10,000 feet in ten minutes. The Allies have placed orders for 7,000 of these machines. The war has developed other motors and American manufacturers are producing better types every day. The time has therefore arrived for the general use of the aeroplane for commercial and pleasure purposes."

"What, then, will be its uses? Will it carry passengers to any extent?"

"Yes. It will not, as I have said, supplant the railroad, but there are certain things that the aeroplane can do better than the railroad. It will be demanded whenever the necessity is for great speed. Few express trains average more than fifty miles an hour—though they make greater speed on short stretches of straight track—whereas that speed represents almost the minimum of the flying-machine. We think nothing of sixty and seventy miles, a regulation



speed of one hundred miles may be expected, and, as said above, certain pursuit aeroplanes now used in the war go at the rate of one hundred and twenty-five miles an hour. At first even the suggestion of such speeds almost takes one's breath away; it seems inconceivable that human beings could physically endure such rapid traveling. But there is one great difference in traveling in the air and on the surface. On a railroad car we are always conscious of high speed; well up in the air we are not conscious of it at all. The sensation is precisely the same whether you are going forty or ninety miles an hour, or, indeed, if you are making no progress at all, as, in a high adverse wind, sometimes happens. A fly in a Pullman car has the same sensation, whether the car is standing still or rushing ahead at the rate of fifty miles an hour—the fly is simply carried along with the mass of air and has no sense of motion. The situation is the same in flying. A speed of one hundred miles an hour, therefore, causes no physical distress. Traveling under such circumstances will be far pleasanter than that furnished by the most luxurious Pullman or automobile. There is no roadbed to jar, and we never know when we are going around a curve. Indeed, the passengers will hardly realize that they are moving at all."

"How will this cut down the time of traveling?"

"The trip from New York to Boston," Mr. Wright answered, "would take about two hours, where now it takes five. From New York to Chicago will take eight or ten hours instead of twenty, as at present. You will be able to make the trip from New York to San Francisco in a couple of days. Now plenty of occasions arise in everyday life when such rapid transit is desirable. The only recourse now for unusually rapid speed is the special train. This has two disadvantages—it costs so much that only railroad presidents and millionaires can use it, and, after all, it does not go very much faster than the regular train. In a very few years, I think, the flying-machine will do all the work that the special train does now. It is not only faster, but it is more comfortable, much safer, and much less ex-

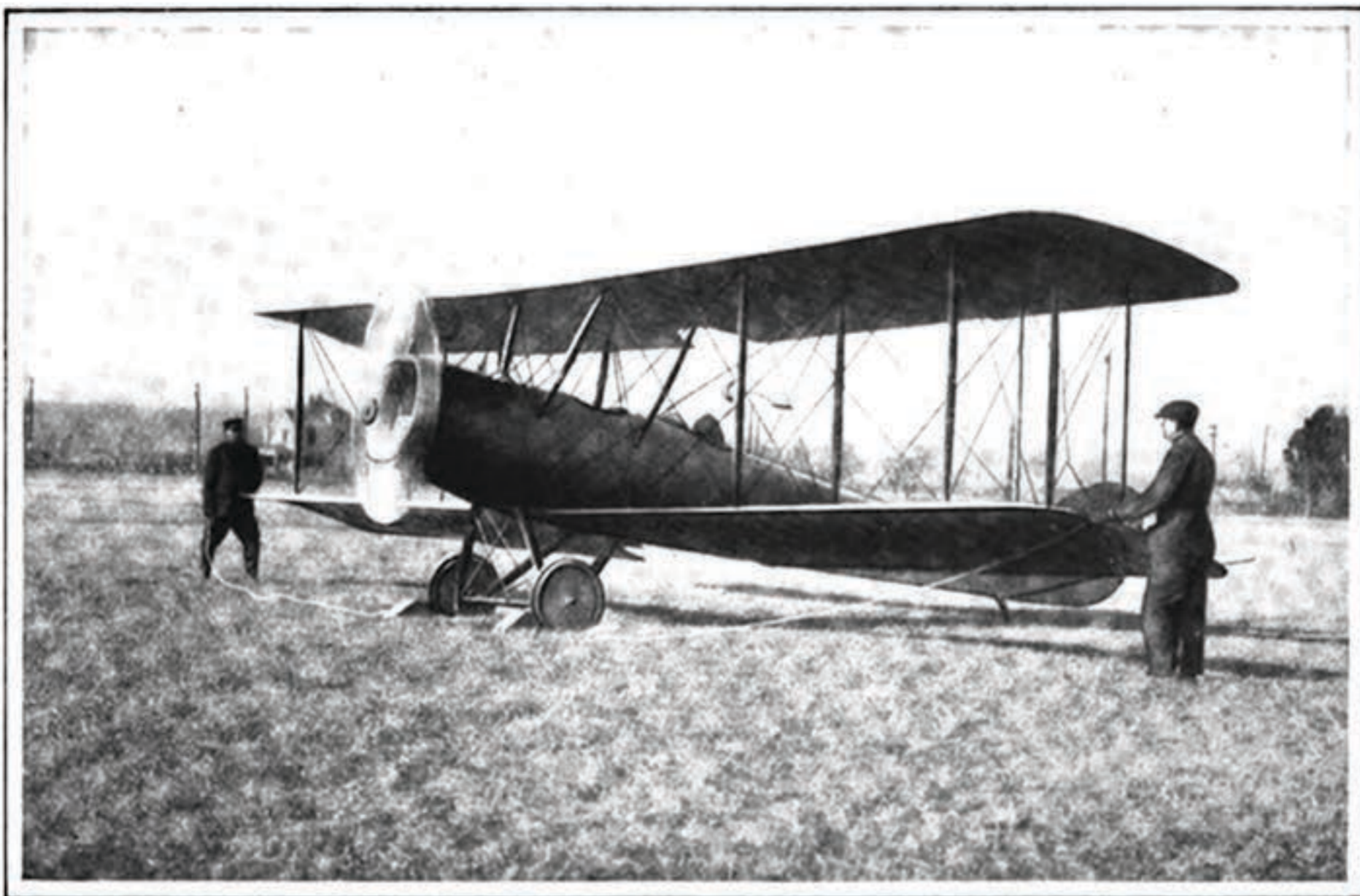
pensive. The New York business man who wishes quick transit to Chicago, where the saving of a few hours will perhaps mean a successful business deal involving millions, will use the aeroplane. So will the man who wishes to reach the bedside of a sick relative, where saving an hour or two may mean seeing his wife or child alive. We frequently read of surgeons being rushed upon a special train, so that they may arrive in time to perform an operation that may save a human life. What a godsend the speedier transit of a flying-machine will be in cases like this!"

"Why isn't such a service established at once?" The question was a natural one.

"Chiefly because of the impediment I have mentioned—the scarcity of good landing-places. It will be necessary to establish such landing-places—that is, smooth level fields—at all important points. We have two or three such model landing-places already—especially those at Dayton and at Detroit. All large cities will have to build such accommodations; future municipal planning will necessarily provide them. With these established in all important points, the day of passenger traffic will begin. This service can supplement the regular railroad in numerous ways. In particular it will make 'missing the train' much less of a calamity than it is now. Suppose, for example, you fail to catch the Twentieth Century Limited at the Grand Central Station; you can jump into an aeroplane and reach Albany in plenty of time to catch it there. Perhaps the greatest service of the passenger aeroplane is that it will make accessible parts of the world that are now little used. There are plenty of places where railroads cannot be built because of the great cost, because of engineering obstacles, and because there is not enough traffic to justify them.

"This brings me to the use of the aeroplane for transporting freight. The present type of machine will never supplant the freight-car, and I cannot foresee that it will ever be used for carrying coal or wheat. But in transporting special small packages, precious freight, it will be extremely useful. Here again





THE WRIGHT-MARTIN MILITARY RECONNAISSANCE MACHINE OF 1917—150 HORSEPOWER

we shall penetrate sections where the railroad cannot carry us. There are thousands of such places in the West, in South America, in Africa. The aeroplane will probably be one of the most potent agencies in the development of Alaska, for here we have an extremely rich country where railroads are difficult and extremely expensive to build. I can best illustrate this by a special instance. There is a certain port in Alaska back of which, about sixteen miles away, lie rich gold-fields. The problem of the company which works these mines is to get supplies to its men and to get the concentrate back to tide-water. The mines are shut off from the port by two ranges of mountains four thousand feet high, and it is inconceivable that a railroad should ever be built across these obstructions. Supplies are now sent by a circuitous route which takes three days to make in the summer-time; in winter it cannot be made at all. The company is now completing plans to install an aeroplane service. In this way the workmen can easily sail over the mountainous barriers and reach the miners in an hour. They can thus carry supplies to the workmen and bring back the concentrate. The money saved will be an important item; the great point, however, is that the mines, with all their

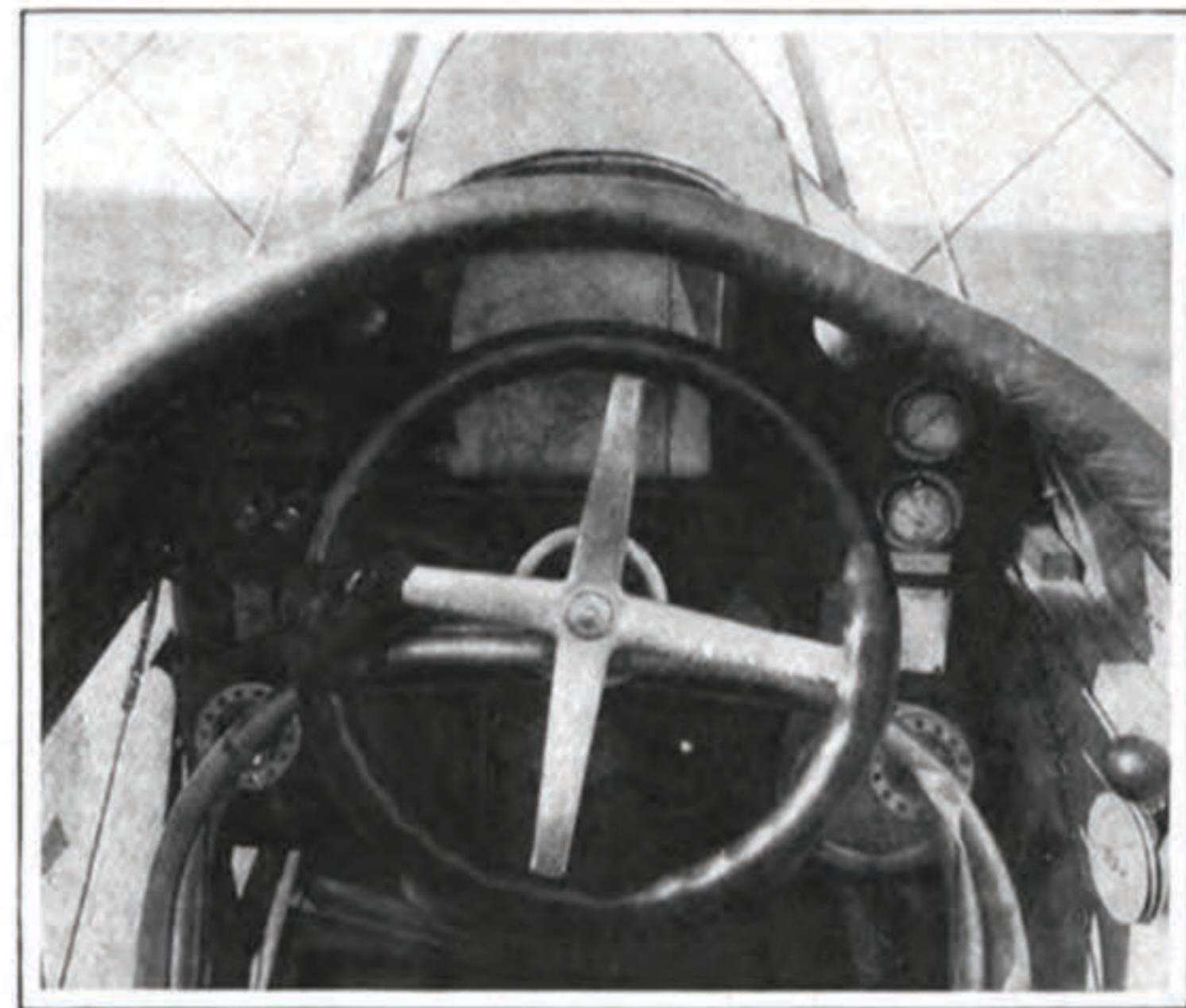
precious output, can be successfully worked for the first time. There are thousands of places, in Alaska and elsewhere, where precisely the same situation exists. In such places the flying-machine will perform much work now done by packhorse and mule, and open up sections where even the mule is useless for transit purposes. One of the greatest obstacles to transportation in Alaska are certain large areas of 'nigger-heads'—flat stretches resembling swamps, with a growth similar to cabbage-heads, which neither man nor beast can negotiate, and across which neither railroads nor highways can be built. These obstructions, of course, will present no difficulty to the aeroplane."

"Will the aeroplane be useful for carrying mails?"

"Not to the extent that some people suppose," said Mr. Wright. "I do not think it will supplant the steamship and the railroad as a mail-carrier, because it will be too expensive. It would take a very large number of flying-machines, perhaps a hundred, to carry as much mail as we now get into a mail-car. You can easily figure how this would increase the expense. It will have the same advantage in carrying mails as in carrying passengers, and that is speed. This statement also needs some qualification,

for, when it comes to quick communication, the aeroplane can never supplant the telegraph and the telephone. But we shall probably have a special rapid mail service by aeroplane, for which we shall pay a higher price and buy a special stamp. The flying-machine will give a ten-hour service between New York

and Chicago and a two-day service from the Atlantic to the Pacific. It will likewise carry letters into remote sections which the mail now reaches only at long intervals or does not reach at all. The United States still has a large number of 'star routes'—routes which the mail-carrier travels on horseback, sometimes consuming days in the journey. The aeroplane can do all this work much more cheaply and much quicker. It goes in a straight line, whereas the star route man has usually to take a round-about course, for mountains and rivers offer the flying-machine no obstacles."



THE NEW YORK-TO-CHICAGO MACHINE, SHOWING THE MAP THAT GUIDED THE AVIATOR

"In Mexico we have had an example of the use of the aeroplane for carrying mails. Practically all the mails from Columbus, New Mexico, to Pershing's column have been carried by air. My friend, Mr. Glenn Martin, who spent several days down there, tells an inci-

dent that illustrates the mail-carrying possibilities of this new contrivance. While visiting Captain Dodd, commanding officer of the First Aero Squadron, stationed at Pershing's supply headquarters in Columbus, Mr. Martin and several officers were standing on the field one morning when a message came saying that Lieutenant Bowen had left Pershing's station, one hundred and twenty miles south of the border, by aeroplane with mail-matter. Captain Dodd related that a daily mail-route was maintained by air. Looking to the south the captain pointed out a familiar dust-cloud which followed the truck-trains, making trips to and from Pershing's station. The great contrast to the trucktrain they were looking at was very striking at this particular time, as the message just received from Pershing said that Lieutenant Bowen was leaving his headquarters by aeroplane. On the horizon was a truck-train

which had been on the way two days and a half and was still a half-day out of Columbus. An hour and twenty-two minutes later Lieutenant Bowen arrived and spiraled into the field. The incident was passed over until train time, eleven-thirty, the hour Mr. Martin was leaving Columbus for New York. As the train pulled out the dust-cloud following the truck-train was still approaching from the south; apparently it was still two or three hours away. It had taken the aeroplane not an hour and a half to make the trip; and the truck-train, covering the same distance, had been two and a half days and had not yet arrived.

"Aeroplanes in Mexico also carried extra officers from one headquarters to another, and important personal matter and express between the two bases."

"But how about the aeroplane as a sport?" I asked.

"I think," Mr. Wright replied, "that it is the greatest sport yet devised. It is far more exhilarating and delightful than the automobile for high speed, and far safer. The time is not far distant when people will take their Sunday-afternoon spins in their aeroplane precisely as they do now in their automobiles. Long tours in the air will offer greater relaxations from the daily grind than long railway journeys. People need only recover from the foolish impression that it is a dangerous sport, instead of being, when adopted by rational persons, one of the safest. It is also far more comfortable. The driver of an automobile, even under the most favorable circumstances, lives at a constant nerve tension. He must keep always on the lookout for obstructions in the road, for other automobiles, and for sudden emergencies. A long drive is therefore likely to be an exhausting operation. Now the aeroplane has a great future for sporting purposes because this element of nerve tension is absent. The driver enjoys the proceeding as much as his passengers, and probably more. He can make mistakes, even lapse in his attention, without any serious consequences. Winds no longer terrorize the airman. Newspaper readers will remember that, ten years ago, my brother and I carefully selected the days

in which we made our flights. Some days, when there was too much wind, we would not fly at all. But we have learned now how to fly, and even strong gales do not now frighten the flyer. He goes up except in the very bad days. The only wind conditions that deter him now are the kind known as 'cyclonic,' when there are great twists in the atmosphere. Under these circumstances he does not fly."

In conclusion, Mr. Wright made one of his most interesting statements.

"Aeroplaning, as a sport," he said, "will attract women as well as men. Indeed, in such aviators as have come to my attention, I find that a larger proportion of women make good flyers than men. I would hardly hazard the statement that women are better aviators—merely that I have found this to be the case in those whom I have met. Just why this should be so I do not know; yet there is a fascination and exhilaration in flying that appeals strongly to the feminine mind. Women also make excellent passengers. I have never yet taken up one who was not extremely eager to repeat the experience. This fact, of course, will hasten the day when the aeroplane will be a great sporting and social diversion."