

# 400-MILE SPEED IN AIR IS FORESEEN

## BUT SCIENCE MUST AID

### Radio Expected to Play Big Part in Faster Machines

## HUMAN LIMIT NOT REACHED

### Experts Say Brain Can Be Trained to Act More Swiftly With Increased Demands.

LIEUTENANTS A. J. WILLIAMS and Harold Brow, who have broken all airplane speed records in the last week, believe that the human body is quite capable of withstanding the physical strain of flying at 300 miles an hour, or even more. Thus far, they say, the only effects from fast flying appear to be cramped muscles and an all-round tired feeling, which they attribute to the constant work of handling the machines while in flight. Aside from the severe strain on their bodies while making short turns they have found no other ill-effects. They consider the risks to be of a mechanical nature only.

At the national air races in St. Louis last month the two naval aviators sent their tiny planes whizzing over a triangular course at more than 240 miles an hour, breaking all world's records. While the airplane designers said the limit to which planes could be made to fly had not been reached, they doubted if the pilots could stand much greater speeds. And medical men asserted that the human body could not survive much greater strains because of the stress placed upon the blood vessels and the entire nervous system.

And yet Williams and Brow a few days ago spent several hours racing each other across the three-kilometer course at Mitchel Field, L. I., one after the other, surpassing their former record, until they had added to it more than twenty miles an hour. Williams finally held the record with an average speed of 266.68 miles an hour. Brow was about a mile behind him, though at one time he was hurtling through space at 274.2 miles an hour. For many minutes, however, both pilots maintained the average of 266.68. They traveled four and a half miles a minute. Only a bullet or a projectile from a big gun can better that speed for any distance. Had they continued, they could have crossed this continent in fifteen hours or less, or flown from New York to Washington in thirty minutes.

"It seems to be a matter of training," Lieutenant Williams said. "There is little difference between 150 and 250 miles an hour on the straight flying. Your controls are set and you travel very smoothly. In making the turns at maximum speed it is vastly different. Everything seems to be leaving your head and rushing to your feet. Sometimes it seems as though I would push the seat right through the bottom of the machine. In the races at St. Louis I 'went out cold' on the turns, though I was able to recover almost immediately on each occasion."

This is explained by physicians, who say that it is the same sensation as that dizzy feeling caused by being whirled around suddenly. The blood is rushed away from the head and brain by the centrifugal motion in turning a corner sharply. In the fast planes this motion is very sudden, and the action is so swift that the pilot feels all his blood rushing toward the lower part of his body. That feeling of semi-consciousness lasts but a moment, however, and then the circulation rapidly adjusts itself to its new condition.

A French surgeon recently experimented with dogs, rotating them on a wheel at speeds of from four to six turns a second. It is said that some of the dogs showed injuries to the brain after it had been pressed against the skull by the centrifugal motion; others underwent an enlargement of the blood vessels in the stomach caused by the rush of blood.

#### Things the Flyer Must Watch.

Both Williams and Brow corroborated the testimony of other speed pilots who have held American records, Bert Acosta, Lieutenant R. L. Maughan, Lieutenant L. J. Maitland and Brig. Gen. William Mitchell. All these have flown at speeds which at the time were startling, because they were faster than any made before. High-speed flying is not confined to half a dozen aviators. Every European nation has its speed experts. Here in the United States the air services have developed a policy of giving all their pilots a chance—assigning a number to the fast planes this year and another group next year, and so on. General Mitchell had never been in a fast plane before his flight in Detroit in October, 1922, when he made a world's record of 233 miles an hour. He said he felt no strain whatever, though, of course, he was not compelled to maintain his maximum speed while making the turns, as one does in a race. Furthermore, General Mitchell was trained to his job, for he had flown almost daily for many years. Otherwise fast flying would have been dangerous for him.

Physically, Lieutenants Williams and Brow offer an interesting comparison. Williams has an unusually powerful physique and weighs more than 200 pounds. Brow is rather slight of build. Yet they experience the same sensations flying, though, due to his lighter weight, Brow does not undergo the extreme sensation of losing consciousness momentarily while making short turns in the races.

The moment their motors are started they are subjected to the most rigid concentration. They have a 500 horsepower engine with twelve cylinders. The propeller is turning 2,300 revolutions a minute, and the noise from the exhaust drowns out everything else. This terrific power must be kept under strict control. The machines are only about 22 feet wide and the narrow tapering bodies some 19 feet long. There is everything to watch—the water in the radiators; the fuel, a 50 per cent. mixture of gasoline and benzol; lubricating oil, the pressure of which is 100 pounds, or the same as that required for a railroad locomotive. The entire machine loaded weighs about 2,000 pounds. All this the pilot must watch and guard con-

stantly from the moment he takes off until he comes back to earth. Every one of his senses must be on the alert. He uses both hands and both feet. His eyes and ears are strained to the limit, catching every sound that may convey some hint of impending trouble. If he falters for as much as an instant it may mean death.

#### All a Matter of Training.

"Of course, we do feel some effects from fast flying, but they are hardly worth mentioning," said Lieutenant Brow. "It all depends upon the machine. I feel no differently flying at 260 than I do at 150. I know I should feel the same if I could make 300. After that, there's no telling. I know hundreds of good pilots who can fly the fastest job ever made. It is all a matter of training. It was only a few years ago that we thought 100 miles an hour was fast. Our students were trained on very slow machines until they had been accustomed to all the motions and tricks of the plane and motor. Of course, one must be physically fit to start with. Then he flies by sense and habit.

"I have never heard of a pilot undergoing an experience which would indicate that there is a limit to the speed which the human body can attain and live. Of course there must be a limit; but I do not believe we have approached it. There is a sort of exhilaration in fast flying which leads one on. There is a sense of power under the control of your own hands. I think that the human brain is quite capable of adapting itself to increased demands. That is, if they build faster machines, it means that the brain must act more swiftly in the emergencies and on the controls.

"The numerous controls and gauges one must watch make fast flying arduous. The position in which we must sit in the machines tires our bodies and cramps our muscles. We are sheltered by windshields and the construction of the machine itself from the terrific force exerted by tearing through the air at four and a half miles a minute. If we put out an arm at this rate we probably should have it torn off completely. Some pilots have had their helmets split and ripped from their heads by being caught in the blast that is kicked back of the air screw. And yet we are able to peer over the sides and, in fact, all around us.

"Every time a newer and better plane is built you may count on its having contrivances to help the pilot, quicken his senses and make the machine more controllable. If you speak of machines much faster than those today, you must take into consideration that engineering principles will change, conditions will be radically different—though until they pass the 300 miles an hour mark they need not worry about the effect of speed on the human body. I think that as long as the brain can function reasonably well, both brain and machine can protect the body, no matter how fast it goes."

#### Flying a Progressive Art.

Lieutenant Williams said there are many pilots capable of making as long flights as the machines will stand. Of course there are no superlatively fast planes today equipped to make a long test, though Maughan's coast-to-coast flight last Summer, in which he got more than half way across the country, was made in the machine in which he won the 1922 races. He was tired and cramped when he stepped out of his machine; but he had felt no physical effects other than those considered temporary. The Army Air Service contemplates another speed test next June, in which a pilot will try to jump from coast to coast in a single day.

"I have no trouble sleeping after a few hours on the fast planes," said Lieutenant Williams. "Nor is my digestive apparatus affected. An hour flying at 250 miles an hour is not so tiresome as five hours spent in a slow machine. There is no reason why we should not be trained to go as fast as our machines can fly. Take for example, a man falling. He retains all his faculties and if he is in constant training he can actually exercise control over his muscles. That is to say, his brain functions. I am sure that we can handle anything that can be controlled, up to 300 miles an hour or even better, without undergoing any hardships to speak of."

Veteran pilots agree that flying is a progressive art. They are of one mind now that future peoples will look back at our generation and laugh at us for feeling astonished that we have been able to make a mere 300 miles an hour. Airplanes will not be the machines of today, but much less complicated. The average pilot places great store in the radio and believes it will one day revolutionize the science of flight. Engines other than the internal combustion motor may contribute to this radical advance, and quickly, they say. Meanwhile the Williamses and the Browns are the best proof that thus far we have not reached a limit in our powers of endurance.

Engineers and scientists say that with present methods of combustion it may be possible to approach the 400-mile-an-hour mark; after that there may be developments which, they think, may increase the rate of speed to 1,000 miles an hour.

## DRAMATIZING THE KITCHEN.

THE familiar labor-saving devices of American homes are attracting attention in European cities. A commonplace kitchen scene from America, when displayed in shop windows, never fails to attract curious audiences. The drudgery of American housekeeping seems to have a remarkable interest for the average housekeeper abroad. When the dramatic action begins, so to speak, and a demonstrator shows the actual use of the unfamiliar utensils, an audience quickly gathers. The up-to-date American kitchen finished in white enamel with glass shelves and similar furniture are regarded by European housekeepers with amazement. The newest forms of gas or electric ranges often are looked upon with distrust.

Many of the labor saving devices displayed are new to the foreigners. The irritating act of peeling a potato with an ingenious American utensil holds the European audience, and the many uses to which electricity is put in the American kitchen also come as a surprise. The dramatization of the American kitchen abroad is part of an extensive advertising campaign carried on by American manufacturers. It is not generally appreciated on either side of the Atlantic that American kitchens are far ahead of those of any other country. The difficulty of securing servants abroad since the war has rendered it necessary for housekeepers to do their own work, or much of it, and the ingenious labor-saving devices in the home just now make a special appeal.