

IGOR SIKORSKY *discusses* FLYING-

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Commercial aviation in the next five years will be flying bigger ships over longer distances at faster speeds and with a greater load of passengers traveling more comfortably and conveniently. There is no doubt of that.

The era of widespread use of private-owner craft seems farther away than five years. The arrival of it would be helped by the development of new types of aircraft with improved takeoff and landing characteristics and possibly by the development of an entirely new type of flying machine, such as the helicopter.

What are these records then, and how may we expect to see them approached in everyday air transportation five years from now?

Here are the records:

Speed—World's records, seaplanes, 441 miles an hour; landplanes, 352 miles an hour. Today air transportation operates frequently at 160 to 185 miles an hour, with some transport planes having a top speed of more than 200 miles an hour.

Altitude—World's record, for balloons, 72,395 feet; for airplanes, 49,967 feet. Air transports today operate normally at altitudes up to 14,000 feet, excepting when they fly up to 18,000 feet to cross mountain ranges.

Distance—World's record, in closed circuit, 6587 miles; airline record, 6267 miles. The longest nonstop distance flown on regular schedule by airplanes today is the 2400 miles from California to Hawaii on Pan-America's route to China.

Up to 15,000 feet I found that I did not need oxygen, that I could move about comfortably and without becoming fatigued. Above 16,000 feet, I was fairly comfortable if I remained seated, but if I moved about the cabin ever so little, the exertion was somewhat as if I had just run up several flights of stairs. By taking oxygen through a tube from a bottle, I could move about comfortably enough up to 20,000 feet.

Above 20,000 feet, I found I needed regular "doses" of oxygen even while sitting still. Without it, objects before the eyes began to darken, and it would not take long for a person to lose consciousness altogether.

Today, the limiting factor is the non-ability of crew and passengers to stand the rarified air of heights easily attained by the airplane, unless some special provisions are made which can be called altitude air-conditioning.

Briefly, this would consist of supplying oxygen or making the cabin airtight and pumping in air to such an extent as is necessary to maintain reasonable conditions for the occupants. If this is done, considerably higher altitudes could be reached without creating discomfort to the people on board.

While stratospheric flight at 40,000 to 50,000 feet is possible even now, I do not think it would be practical for scheduled transportation within the near future.

It is believed, therefore, that substratospheric flight, up to altitudes of perhaps 20,000 to 25,000 feet, is the more immediate prospect.

Now for speed. Recently scientific investigations have shown that about 525 miles an hour is the ultimate possible with the type of machine we are now able to build. As every one knows, lift is created by the speedy passage through the air of a plane, or airfoil. But this same airfoil as it passes through the air faster and faster, encounters an ever greater resistance or drag.

The increase of the lift and of the drag continues to be about proportional to the square of velocity until the speed of about 500 miles per hour is approached.

At this point or soon afterward the flow of air becomes disturbed, the drag increases considerably and smooth movement through the air for the airplane is not possible.

The speed of 500 to 525 miles

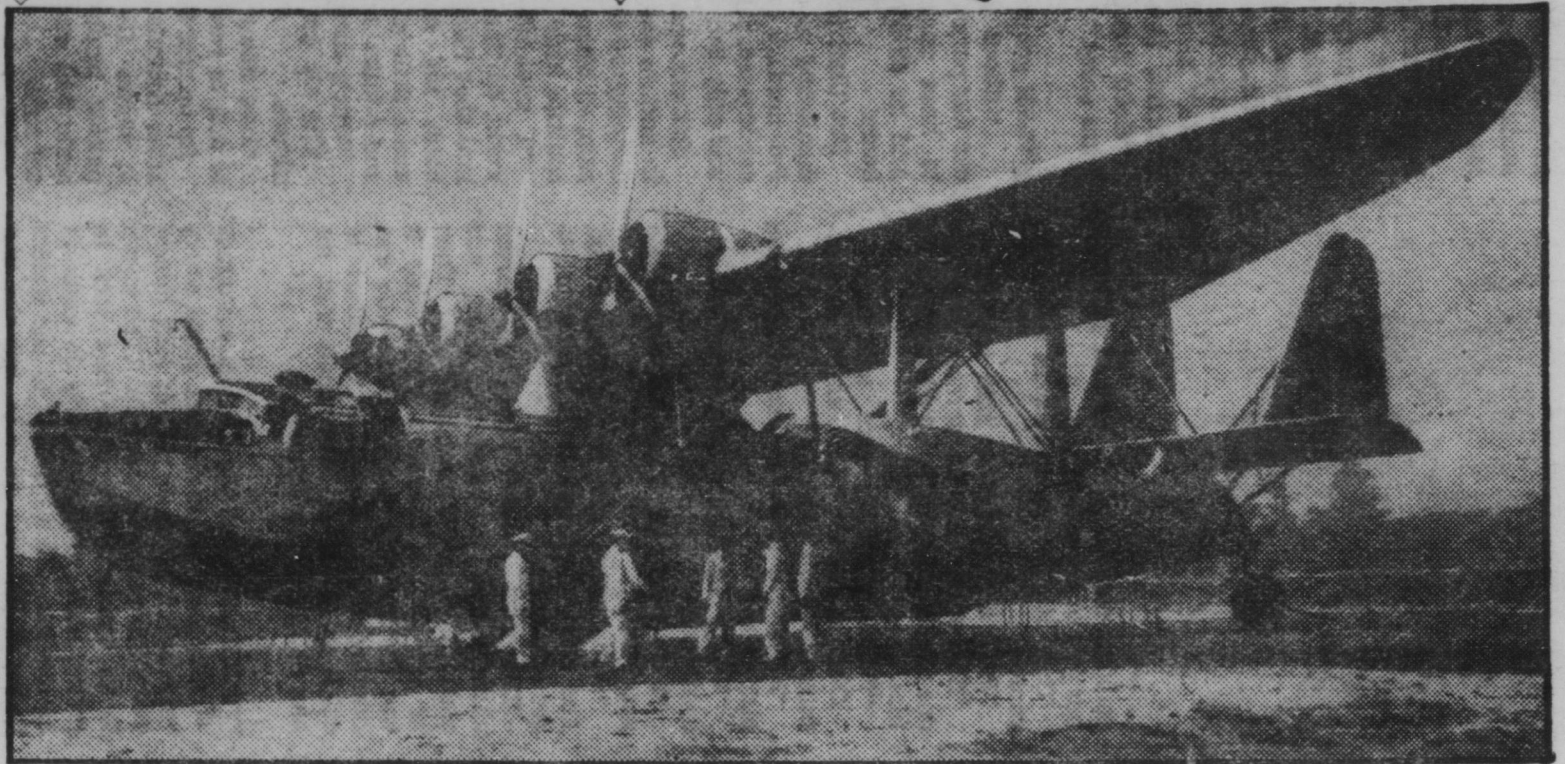
per hour may be approached within 10 per cent, during the coming five years, in pursuit or racing planes if extensive engineering work would be made. Commercial transport planes will still remain far below this figure.

So far as distance is concerned, the range of our airplanes is sufficient today for the longest hops which the geography of the earth makes necessary.

Within five years certainly, it should be a practical and regular

business for passengers to be able to go around the globe in a week, if they are in a hurry. Excursions to the North Polar regions or to the South Seas will probably have been developed by that time.

The commercial era of aviation is here and Igor I. Sikorsky, whose planes are making the experimental runs over the Atlantic tells in the accompanying article his views of what the next five years will bring to the world in the field of flying.



Here she is, all set for flight, the Pan-American Clipper III. The ship successfully negotiated the Atlantic

Eating Between Meals Builds Workers Health



AMONG recent contributions of scientific research to the problems of industry, one of the most valuable has been the discovery that fatigue is often more a matter of nourishment than lack of rest.

Workers become tired and consequently less efficient and less productive, because of too long periods between meals. They simply need fuel more often.

Reports compiled by the National Dairy Council show some remarkable benefits—both in terms of human health and industrial productivity from between-meal feeding.

Having tested out the between-meal milk service over a long period, and checked the benefits in terms of health—shown by a lower percentage of absenteeism, as well as a marked upward swing in efficiency—many large industrial units now regard this service as indispensable.

Widespread Practice

Just how widespread the practice has become is shown by a recent tabulation of the types of establishments where it now functions.

The list includes manufacturers

Noted scientists are leading advocates of eating between meals for workers in factories and offices.

of clothing, shoes, hosiery, textiles, paper products, rubber products, pharmaceuticals, furniture, china and glassware, paints and varnish, foods, tobacco, metal goods, telephone and life insurance companies, foundries, refineries and wholesale groceries.

Many government workers are also between-meal consumers of milk. Eighty-three plants, employing a total of 115,230 workers, contributed to a recent survey, testifying to the improved health and higher efficiency of their employees. In this group, 42 per cent conducted a mid-morning milk service, three per cent a mid-

afternoon service, and 55 per cent had adopted both.

Here are some of the benefits which plant executives report:

Employees work with greater ease, thus increasing their output and their earning power.

They perform their tasks with more accuracy and less strain.

There are fewer absences due to illness, consequently a higher level of plant production and less loss of pay to the worker.

Factory morale is improved.

Accidents due to fatigue and unsteady nerves are fewer.

The workers are in better physical trim at the end of the day.

All of these findings are a practical reflection of conclusions which have been reached by scientific researchers in the field of industrial productivity—notably Haggard and Greenberg, distinguished physiologists of Yale University.

These two scientists chose as their laboratory a plant manufacturing rubber footwear and made tests under factory conditions.

Two groups of workers were chosen for comparison, one eating three regular meals daily, another eating three regular meals plus a mid-morning and mid-afternoon feeding and a third group was composed of workers who skipped breakfast.

Milk Best

Efficiency was measured in terms of average hourly production on one operation in making shoes, and here's the score: The no-breakfast group, 172 units hourly; three-meal group, 183 units hourly; three-meal plus two supplementary feedings group, 191 units hourly.

It was discovered also that the supplementary feeders had decidedly the best of it in maintaining a high level of muscular efficiency. The breakfast skipper maintained it for only a little over two hours of the working day, the three-meal group for four hours; the supplementary feeders for hours.

In addition to these striking results in terms of production and efficiency, the investigators reported benefits which cannot be reduced to figures, but are equally impressive from the human viewpoint. Among the between-meal eaters, they found an "improved feeling of general well-being," "more zest for the work," "less irritability late morning and late afternoon," and "fewer mistakes."