THE NATIONAL AIR COUNCIL

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May 12, 1949

Mr. Amon G. Carter, President
Carter Publications
400 West 7th Street
Fort Worth, Texas

Dear Mr. Carter:

Knowing of your interest in the 'round-the-world flight of the Lucky Lady II, I am sending you herewith two advance copies of the June issue of "The National Air Review".

You will note that our feature article is one by Captain James Gallagher which appeared not so long ago in "Collier's". While the Review is still not big enough to permit us to run these articles in the length I would prefer, I still think that the excerpts we are publishing will generate a great deal of interest. Your attention is also called to the article on guided missiles by General McNarney on page 2. This is as good a summation of the guided missile program as I have seen to date.

With best personal regards,

Sincerely,

Chuck Frazer

Charles D. Frazer
Executive Secretary
Assistant Treasurer

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THE NATIONAL
AIR REVIEW
ABSTRACTS OF UNUSUAL INTEREST FROM AVIATION WRITING, THOUGHT AND STUDY
PUBLISHED BY THE NATIONAL AIR COUNCIL
JUNE, 1949

MY HOP AROUND THE WORLD

By CAPTAIN JAMES GALLAGHER
as told to BILL DAVIDSON

After two months of arduous training and practice for a secret mission, Captain Gallagher and the crew of a United States Air Force B-50 — the Lucky Lady II — set out on what was to be an historic adventure: the first non-stop flight around the world. Following is an account of the flight itself from the moment of take-off.

. . . We tottered out onto the field in the darkness. We checked everything on the Lucky Lady for the 100th time, and we loaded on cans of food and 70 gallons of water. We were ready to go by late morning. It was Saturday, February 26th.

At 11:21 A.M. came the take-off—and a bit of heart failure! First, just before the take-off, Captain James Morris, the copilot, yelled at me, "Smell the blankety-blank gasoline fumes!" The fumes were there all right, and the sweat stood out on my forehead. I looked out and spotted the trouble. A gas tank was overflowing and dripping down beneath the plane. We fixed the tank and moved away from the fume-laden area.

That was just the *beginning* of the sweat. The plane was carrying the heaviest load ever handled (we were well above the 142,500-pound maximum weight allowed for the Stratocruiser, the civilian equivalent of the B-50), and as we lumbered down the runway with our cargo of highly explosive high octane, I thought we never would get into the air.

This was *the* big hurdle, and I kept thinking of the grim possibilities. A tire could blow, an engine could cut out, the bomb bay doors might fall open—any of which could send us up in flames and convert us all into burnt toast. I could hear the second pilot, Lieutenant Arthur Neal, holding his breath next to me as we got a few feet off the ground and I gave him his orders: "Landing gear up!" . . . "Reduce power!" . . . "Wing flaps at 15 degrees!" . . . "Flaps to 5 degrees!" . . . "Bring them up all the way!"

Another Moment of Suspense

Then came that dreadful second in time when you're airborne, and you still haven't got enough flying speed, and the slightest loss of power could mean crashing to the ground. We went through that second, and I could hear Neal let out his breath. I did the same thing. We looked at each other. We both were soaked with perspiration.

After that, we increased our air speed, climbed into the overcast and finally broke out into beautiful clear weather over east Texas, near the Mississippi River. Each man then went to his own nook and got squared away. We had built a wooden table in the front pressurized cabin, just behind the upper forward gun turret. Two men slept on top of this table on air mattresses and comforters. In the space below the table, we stored food.

Behind the table was a long padded tunnel over the bomb bays, 30 feet long, in which nine of the 14-man crew slept, two at a time. Three men stretched out in the rear cabin. This was all very comfortable, except that whenever anyone had to go to the bathroom, he had to crawl over several bodies; and when one of the navigators had to go up into the astrodome to shoot the stars, he generally stood on someone's neck or some other sensitive part of the anatomy. Since we had two or three men for each job on the plane, we were able to get a few hours' sleep out of every 24.

So far as food was concerned, each man made his own by opening a few cans whenever he got hungry. We had hamburgers, spaghetti and meatballs, etc., in self-heating cans; and we had a couple of electrical gadgets to warm orthodox cans and to make coffee. We were good housewives. We brought along two bottles of the stuff that is supposed to dispense with kitchen odors and keep the place filled with fresh air.

(*Continued on page* 13)

Index

THE AIR FORCE GUIDED MISSILE PROGRAM

An excerpt from a speech by GENERAL JOSEPH T. MCNARNEY *before a meeting of the Society of Automotive Engineers. This was only one of the topics dealt with by General McNarney in his talk, which was entitled "Recent Air Force Research and Development Activities" and which recounted progress in such fields as aircraft development, air defense systems, and rocket and jet engines.*

. . . . The aim of our guided missiles program is threefold — to implement the primary mission of the Air Force in the air defense of continental United States, the tactical support of ground forces, and strategic air warfare to destroy enemy capacity to wage war. To accomplish this threefold mission, four major types of missiles must be developed: air-to-air; air-to-surface; surface-to-air; and surface-to-surface.

Let us consider the problem of the air defense of the United States. Visualize an enemy bombing raid of this City of New York, or Washington, or Chicago — or perhaps all simultaneously. . . . How would we repulse such an attack by the use of guided missiles?

Having electronically detected the approach of enemy formations, the Air Force would first dispatch high speed interceptors. However, instead of possessing the conventional 50 calibre or 20mm guns of World War II with an effective range of only 300 or 400 yards, these aircraft would carry air-to-air missiles which could be launched from our interceptors and proceed under their own rocket power at supersonic speeds to targets several miles from our launching aircraft. By means of a radar homing device within the missiles, they will track down the enemy even though he may be engaged in evasive action; and, by means of a proximity fuze, they will be detonated when within lethal range of the enemy. . . . With the basic knowledge now available, we can visualize the size, configuration and performance of such a missile. Its development into an operational missile will take only a relatively short period of time.

Suppose the enemy gets through our interceptors with their air-to-air missiles, then our surface-to-air missiles will come into action. These will be fired from defensive ground sites surrounding our strategically critical areas, such as large industrial centers and military installations. They can be guided to their targets by riding along a movable radar beam at supersonic speed, the center line of which is kept on the approaching enemy aircraft. When the missile gets close enough to the target a radar seeker will be activated. This will carry the missile into the target, or at least close enough to permit a proximity fuze to detonate a lethal warhead and strike the enemy from the sky.

The problem of defense against attack by enemy missiles of the V-2 rocket type is considerably more complex. It will require a missile much like the V-2 itself. This missile must be launched with split-second timing to intercept its target which will approach from outside the atmosphere at supersonic speeds of at least 3600 m.p.h. Our defensive missile must, therefore, be capable of supersonic speeds of approximately 4000 m.p.h., and of operation beyond the earth's atmosphere. Consequently, such a missile must be a multi-stage rocket with provisions for control out of the atmosphere where aerodynamic control surfaces are of no use. The technical complications involved in this problem render such a missile unattainable for perhaps a decade.

The tactical Air Force plays a vital role in supporting the ground forces on the field of battle. The development of air-to-surface missiles which can be pin-pointed on both fixed and moving targets will be of inestimable value in such operations. Strategic air warfare also imposes on the Air Force the requirement of striking the enemy at home — to destroy his industrial areas, his lines of communications and his will to fight. . . .

The weapons of the future will be more effective than those of the past. Air-to-surface guided missiles will be developed which can strike a specific enemy target with high accuracy. Large bombs of the 12,000-pound, 22,000-pound and 43,000-pound class will be deviated in their downward course to the target by electronic controls. These missiles will not have any means for propulsion — they will be free fall bombs. Such developments are in the immediate future, with the 12,000-pound bomb being available within the next year.

The next development in line, timewise, will be missiles which contain their own means of propulsion. Such missiles can be launched from a mother airplane outside the enemy's highly defended areas and can be rocket propelled, or ram-jet propelled, at supersonic speeds to the target.

To protect our bomber formations . . . . we must look to the air-to-air missile as a defensive weapon. This weapon will be similar to that used by our fighter or interceptor aircraft in the defense of our home territory.

Finally, we come to the weapon that all of us visualize when we hear the words "Push Button Warfare" — the surface-to-surface missile. This is the weapon which would be launched from our own territory, maybe Omaha, Nebraska, maybe Alaska—by the push of a button and travel to distant targets at ranges up to 5,000 miles away from the launching site. Such a weapon, we feel, must be a weapon of accuracy rather than one of area bombardment such as the German V-2. It must be able to deliver a knockout punch on a specific target.

The first missiles of this type to be available will probably be of conventional aircraft design with sweptback wings, operating at subsonic speeds of six to 700 miles an hour, powered with turbo-jet engines. . . . The problems of speed, range and payload is solvable with relative ease. The critical problem, however, is guidance. Ideally, the optimum guidance system would be one which is self-contained within the missile and is non-jammable by the enemy. Technical difficulties posed by this problem, however, cannot be solved in a matter of days or weeks. Push button warfare therefore is still in the rather distant future.

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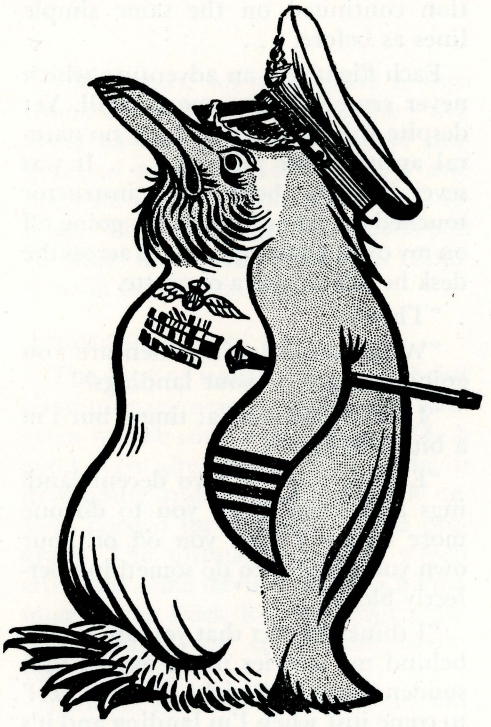
THE CONFESSIONS OF A "PENGUIN"

Anybody who has learned to fly — or tried to learn — will be amused by the efforts of "A.H.S." to win his wings in the Royal Air Force back in the early days. Reprinted from THE ROYAL AIR FORCE QUARTERLY.

INTRODUCING A "PENGUIN"

In Royal Air Force parlance, a Penguin is "one who, although wearing wings and may have been able to fly in the dim past, is now earthbound and struts around with an air of great importance, like the quaint little bird he is named after, or, when not doing this, appears lost in reflection upon the days when, with quite inadequate wings, he soared into the skies above him at great risk to himself and everybody else."



Learning to Fly

"He flies through the air with the greatest of ease,
That daring young man on his flying trapeze."

During my twenty years as a pilot I had much in common with that daring young man about whom the above-quoted popular song was written. It was equally essential to both of us that there should be nothing in our path of flight if we were to continue to "fly through the air with the greatest of ease." Also, with all due modesty, I claim that there was equal daring in our respective performances.

For years I had a lot of trouble with my flying.

My own opinion, for what it is worth, is that my average of "breakages per hour flown" was unduly high owing to lack of initial instructions.* Whether flying is a game of skill or chance I am still uncertain. The fact that I am still flying makes me believe that there is definitely an element of chance in it.

It is essential that at least an outline of my training as a pilot should be known, so that the extent of my knowledge of aviation, when faced with a difficult situation, can be fully appreciated. My instruction was outstanding in its simplicity. I was not asked to study "The Theory of Flight," neither was I told why the innumerable combinations possible between the throttle, elevator, ailerons and rudder caused the aircraft to react in a known manner. I was shown, by demonstration in the air, what reactions might be expected from the aircraft in normal flight when the controls mentioned were in certain positions. My aim was to memorize sufficient of these various combinations to enable me to take off, fly in a direction chosen by myself and not the aircraft, and to land it without breaking it.

After persevering for twenty years I am beginning to believe that one day I shall be sufficiently familiar with the idiosyncrasies of aircraft to take one off without risk to others, retain more or less complete control of it in the air, and land it with a reasonable element of safety. I should add that of navigation, engines, rigging, meteorology, flying regulations and aerobatics (except those which are involuntary) I know nothing.

The conversation that took place on my first day's instruction when we were both seated in the aircraft was something as follows:

"Can you hear me?"

"Yes."

"Have you done any piloting before?"

"No! I know nothing about it."

"Oh, hell! Never mind; you'll soon get the idea. I'll control the throttle, so don't touch it."

"I wouldn't recognize it if I saw it."

Laughter came down the speaking-tube.

"Fasten your safety belt. We're off. I'll give you the 'feel' of the controls when we are in the air."

"All right; I'm ready."

After we were airborne and well above the aerodrome the conversation recommenced.

"Put your feet lightly on the rudder-bar and take hold of the stick. Now I want you to try and follow the movements that each makes when I turn to starboard." He did a steeply banked turn to the right.

"Did you get that?"

"Yes. The rudder-bar seems to work like that in a boat."

"It does for mild turns, so you have learned something already. What did the stick do?"

"You seemed to be stirring an invisible Christmas pudding with it." This brought unintelligible mutterings from the other end.

"We will try something simpler. Try and fly on a straight and level course. Push the stick forward to push the nose down, pull it back to pull the nose up. You know all about the rudder." That last remark was typical of my instruction!

I had grasped that in level flight if you pressed the right-hand end of the rudder-bar the nose of the aircraft tended increasingly to turn in that di-

(*Continued on next page*)

* *(It is necessary to explain that my training as a pilot was unique: having flown as an observer in the last war, being over thirty years of age and allocated to the R.A.F. for staff duties, it was not considered necessary to send me on the proper course that every other potential pilot is given. Such courses are very thorough and cover every aspect of flying. I was not sufficiently fortunate to receive this orthodox instruction.)*

rection. My instruction therefore on the use of the rudder was complete. (Shades of past pilots shudder.) When the reins were placed in my hands the aircraft immediately became a hard-mouthed horse and I had very little control over it.

* * *

Weeks and then months passed and I was still trying to follow what the stick did in taking off, turning and landing. Sometimes I nearly grasped the mystery, at others the aircraft did exactly the opposite to what I had expected. One afternoon, after I had made two consecutive landings without my instructor having to shout "I've got her," as he skilfully staved off an impending crash, he taxied back into wind ready for take-off and then proceeded to climb out.

"Make one circuit of the aerodrome and then come in and land. Best of luck."

I grinned back. This was my first solo, always a thrilling moment for potential pilots; mine was going to provide a thrill for quite a number of people. In taking off I saw with some anxiety that I was not high enough to clear the hangars at the far side of the aerodrome. I think the aircraft realized it also, for it gently swung its nose so that it flew between two of them, and the wings cleared the tops of the hangars on each side by a few inches. All those working within came out to see who was "crazy flying." I did my circuit and then got into position to land, closed my throttle and then proceeded to glide earthwards. When I reached the edge of the aerodrome where my wheels should have gently touched down, I was twenty feet or more too high. This perplexed me. After that everything happened very quickly. I pushed my stick forward and immediately my speed increased to 70 miles an hour, making the wires hum and whistle. The main road which ran through the middle of that aerodrome came into view, my wheels struck the ground this side of it and I bounced high enough to have cleared any vehicle on the road. The next impact with the ground was over the road and too much for even the stoutest undercarriage. It collapsed. There was a horrible tearing and splintering noise and then I found myself hanging upside down. I undid my safety belt and promptly fell on my head, which gave me a foul headache all that evening. Nevertheless, I had completed my first solo flight. . . .

Soon after this episode I was sent to the R.A.F. Station at Kenley, where I was to complete my qualification as a pilot when I had learnt to fly a "Service type" aircraft. There my instruction continued on the same simple lines as before. . . .

Each flight was an adventure which never ceased to give me a thrill. Yet despite this I seemed to have no natural aptitude for piloting. . . . It was several weeks before my instructor touched on the subject of my going off on my own. Leaning forward across the desk he offered me a cigarette.

"Thanks."

"Well, you old stiff, when are you going to improve your landings?"

"I land quite well at times, but I'm a bit inconsistent."

"Exactly! You do two decent landings and when I ask you to do one more before I send you off on your own you proceed to do something perfectly bloody."

"I think the fact that you are sitting behind me worries me. I expect that sudden shout, 'All right, I've got her!' to come just when I'm landing and it's distracting."

"I hope you're right. You seem full of confidence. I don't think you realize the ghastly things you do at times."

"Where ignorance is bliss . . ." I grinned at him. "Well, what about my solo?"

"All right, come along. If you can do one of your better landings this time round I'll let you try on your own."

I not only went off solo but after three permissibly small bounces found myself back in front of the hangar with the aircraft still all in one piece. To my disappointment I found my instructor had not watched my performance. . . .

* * *

The following day I was sent up to practise "circuits and bumps" on my own and met with my first really bad luck. The strong wind necessitated my taking off over the hangars. My first landing was a very fast one and halfway across the aerodrome my tail was still airborne and I was rushing towards the hangars at about sixty miles an hour. An alarming situation for a novice, and, although it seemed to be taking a terrible chance, to me there was only one thing I could do. I opened my throttle wide. With a roar of engine I rose over the top of those hangars. Luck was undoubtedly with me, and I felt a good deal of relief. Perhaps I had not touched down far enough away from the hangars. Next time I used all the run available. Yet again with tail well up that "blue-pencilled" aeroplane showed no signs of stopping its wild career towards disaster. I saved myself again by giving my engine full throttle and just skimming over the hangars. Twice more I tried, with the same result. By the groups dotted around the aerodrome my attempts to land were being watched by a large number of people and I saw the drivers of the ambulance and fire tender moving their vehicles on to the aerodrome. I'm sure with kindly intentions, but it gave me rather a cold feeling in the stomach and I felt very lonely careering about the sky alone.

The problem was too big for me. I was doing everything I had been taught and yet I was in charge of a runaway aeroplane. It was quite clear where its run was going to end and I had no intention of being with it when it entered that hangar. This time, as I came into land, I undid my safety belt. The moment I had landed and realized that there was no change in its behaviour I left the controls and sat on the edge of the cockpit. After crossing three-quarters of the aerodrome like this, whilst still doing about forty miles an hour, I "abandoned ship." As I was in the middle of about my third somersault over the ground I heard a sickening crash.

When I came out of hospital, at a subsequent inquiry it was found that "the throttle barrel had jammed and therefore the throttle was not closing properly." I was also asked why on earth I had not switched off the engine. It hardly seems credible, but the idea never even occurred to me. . . .

(It should be added that "A.H.S." finally completed a cross-country with only a minor crack-up and did win his R.A.F. wings.)

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THE PROGRAM FOR NEW AIDS TO AIR NAVIGATION

Last month, The National Air Review published a resumé by D. W. RENTZEL, *Civil Aeronautics Administrator, of the needs and requirements for all-weather air navigation. Here, in excerpts from a recent speech by Mr. Rentzel before the Institute of Radio Engineers, is a description of the revolutionary navigation devices now being developed.*

THE art of piloting an aircraft from one spot to another, when the earth is invisible through cloud and storm, has progressed rapidly in the past 20 years. But today, civil and military aviation jointly are entering a revolutionary new phase of air navigation which will have a major impact on the American way of living and on our ability to defend ourselves in case of war.

Back in the days when an airplane was a novelty, a pilot could fly when and where he pleased without fear of collision, providing he maintained a safe altitude above the ground. The notion of air traffic control would have amused and amazed him.

But by the early 1930's, enough air traffic had developed to make definite airways necessary . . . Too, the need for guidance when the pilot no longer could see the earth became more and more pressing. As a result, the Federal Government installed a system of airways throughout the country, using the best radio devices known at that time.

Earlier Navigation System

This air navigation system centered largely around four-course low-frequency radio ranges, plus radio location-markers, and low-and-medium frequency voice communication channels. Just before the start of World War II, the Civil Aeronautics Administration began installing very-high-frequency Instrument Landing Systems. This system, which provides radio beams down which a pilot can fly his plane until he sights the runway, was adopted by the military forces.

The low-frequency ranges and communication systems served a useful purpose, and still are in general use today. But they have serious drawbacks, and have been outmoded by new electronic inventions . . .

Fortunately, all significant groups connected with civil and military aviation have agreed on a definite program to modernize our airways and make all-weather flying a universal reality. This program was developed through the Radio Technical Commission for Aeronautics . . .

Transition Phase

The first, or transition, phase of this revolutionary new air navigation program will be completed about 1953. A good start already has been made in developing and installing the new devices needed for this part of the program. The ultimate program, which envisions some devices which a highly imaginative Buck Rogers might envy, is scheduled for completion about 1963.

Now let us look at some of the old and the new air navigation equipment. Earlier, I mentioned the four-course low-frequency range. This range offers, as the name implies, only four paths to or from the range. In order to stay on one of these courses, the pilot must listen continuously to dots and dashes which blend together when he is in the exact center of the airway. Needless to say, this is exacting and during thunderstorms and periods of heavy static, the range becomes difficult and even impossible to hear. There is danger, too, of the pilot confusing the courses and flying on a wrong heading.

Omniranges

To replace this kind of range, the CAA has been installing what is known as omni-directional, or omniranges. These offer the pilot an almost unlimited number of courses which he may fly. And the omniranges, operating in the very high frequency part of the radio spectrum, are largely free of static and interference.

Best of all, with the omnirange, the pilot can fly by eye instead of ear. An occasional glance at a vertical needle in his cockpit is all the pilot needs to keep him on the right heading. About 250 of these omniranges are now operating in the United States, and the CAA program calls for an eventual total of about 400, blanketing most of the country with signals.

The omnirange gives the pilot simple, clear information about the course he is flying. If he is flying northeast, for example, on a course of 45 degrees, the numerals zero four five will be continuously visible. And the words "to" or "from" will tell him clearly whether he is on a course to or from the station. This course indication is entirely independent of the aircraft compass, and shows the track actually being flown, regardless of cross winds and the plane's heading. The difference between the omnirange course and the indicated magnetic heading continuously shows the pilot the amount of correction necessary for cross winds. But the pilot need not concern himself with this unless he wishes; if he flies by the vertical needle his wind correction is automatic.

Distance Measuring Equipment

Each omnirange eventually will be equipped with a device called Distance Measuring Equipment or DME. With suitable equipment in the aircraft, the pilot always will know his exact distance to the omnirange. This information will be displayed in the cockpit by a simple pointer on a dial. With the omnirange and the DME combined, the pilot continuously will know his exact position in space, without having to work out navigational problems.

In addition to all this, an electronic brain called a course-line computer has been developed. This device solves difficult navigation problems with the

(Continued on next page)

NAVIGATION AIDS—*continued*

speed of light. Using this computer, a pilot won't need to fly directly to or from an omnirange. He can set a course from one selected point to another, and then let the computer, which uses signals from nearby omniranges, guide him accurately to his destination.

These new devices, all of which will come into general use in the next few years, will make possible multiple airways between cities, relieving the traffic congestion which already has passed the saturation point in many parts of the country.

Very-high-frequency voice radio, which is static-free, is coming into general use along the airways. It is making a definite contribution to safer flying. For the ultimate program, however, a private-line system will be developed for instantaneous, automatic transmission of information between ground and air.

Take-offs and Landings

So far, we have discussed the new equipment which will guide aircraft along their routes. Equally important, however, is the problem of getting them safely into the air, and onto the ground, during low visibility. For all-weather flying, this is just as important as safe and reliable navigation enroute.

We have available today two entirely different methods of bringing aircraft safely to a landing through low ceilings. One, mentioned earlier, is called the Instrument Landing System, and uses radio beams. The second, using precision radar principles discovered during the war, is called Ground Controlled Approach. Each system has advantages, and each system has drawbacks. Each *can* be used separately. But when used together, as recommended under the RTCA program, they provide the pilot with a double check on his position at all times, and achieve the closest to ultimate safety which our present knowledge permits.

With the Instrument Landing System, two radio beams are transmitted from the airfield. Received aboard the aircraft, these beams operate a cross-pointer indicator, which is simply a dial with two needles crossing in the center. The vertical needle, which also is used with the omnirange, tells the pilot whether he is properly lined up with the center of the runway and, if not, which way he must turn. The horizontal needle tells him whether he is above or below his proper glide path, and how to correct his descent if necessary.

Lower Landing Minimums

The ILS system is simple, positive, and in wide use by our scheduled airlines. Already, it has permitted the CAA to lower landing minimums from 400-foot ceilings to as low as 200 feet in many locations, greatly improving schedule reliability. Similar reductions in ceiling minimums have been approved where radar systems are in use.

The radar landing system, called Ground Controlled Approach or GCA, permits a controller on the ground to "talk the pilot down" over ordinary voice radio channels. The ground controller watches two radar screens.

The first, known as the surveillance radar screen, enables the operator to locate aircraft flying within a 30-mile radius of the airport. After positively identifying the aircraft on approach as a particular dot on the screen, the controller guides him safely into and through the holding pattern.

When the plane is ready to head in for a landing, the precision radar screen comes into play. The correct path to the runway is shown by lines on the screen, and if the dot representing the plane gets off the lines, the controller tells the pilot exactly how to correct his course.

This ground controlled approach radar may be used independently, or to monitor an approach made on the instrument landing system.

Systems in Operation

At present there are about 80 civilian Instrument Landing Systems in operation. We have improved-type surveillance and precision radar equipment for ground controlled approaches at LaGuardia Field in New York, at Washington National Airport, and at Chicago. As rapidly as funds and manufacturers' delivery schedules permit, we are installing additional GCA radar sets at the busiest airports.

At other large airports CAA is planning to install the surveillance radar unit alone. This will permit the traffic controller to watch all the aircraft in his vicinity through radar, even when the weather has closed in. The controller can be certain that each plane is in its reported position, thus reducing collision hazards and speeding up the landing and takeoff sequences at the airport.

There has been some misunderstanding by the public of the whole subject of radar. Many people believed that war-developed radar would, in some magic way, instantly transform aviation into an all-weather transportation system, free of hazards and navigation problems. Ultimately, it promises to do just that. But we still have quite a way to go.

Wartime Radar

For one thing, military ground radar equipment designed for use on the fighting fronts proved to be inefficient and unsatisfactory for everyday civilian use. An extensive program was necessary to design, test, and produce ground radar which is economical and equally useful for civilian and military aircraft.

Airborne radar, as produced during the war, was a heavy item of equipment . . . Overseas, where there were no other navigation aids, it was a necessary piece of military equipment, well worth the extra weight and manpower.

But in a country like the United States with adequate navigation aids, airborne radar of the wartime type cannot justify itself in commercial operation. A pilot can get far more navigational information from radio ranges, and use it more easily, than from radar equipment in his plane.

However, airborne radar does show promise in two special fields. Numerous experiments have indicated that a satisfactory light-weight radar can be produced which will help pilots to detect and fly around thunderstorms and other turbulent areas. Eventually, also, someone may develop a satisfactory radar collision warning device.

New Applications

New applications of radar and television really will come into their own in the ultimate RTCA program, which

will provide an air traffic system of almost inconceivable magnitude and precision. Some of the equipment needed has not yet been invented. But the specifications have been laid down, and the principles on which it will operate are understood. No one doubts the ability of American electronic engineers to produce the needed air and ground devices.

Here, in a general way, is how it (the ultimate air navigation system) will work:

Before a pilot even takes off on a flight, a landing time will be reserved for him at his airport of destination. As he flies along, a dial will tell him in minutes and seconds whether he is ahead or behind his exact schedule, and he will slow down or speed up accordingly.

In the cockpit the pilot will see a pictorial presentation of everything around him. This picture, probably televised to him from the ground, will show his own aircraft in relation to others in his vicinity, indicate obstructions or other hazards, and even show the location of storms and turbulent air.

At the same time, radar will be continuously watching him from the ground. By means of a block system, something like that used on railroads, the pilot will be assured that he is in safe air space at all times.

Electronic Brains

The aircraft of the 1960's will carry equipment which continuously transmits to the ground the readings of the various cockpit instruments. Electronic brains on the ground will check these readings automatically against information derived from radar and other sources. If, for example, the altitude shown by ground radar differs from the altimeter reading in the cockpit, the pilot will be instantly and automatically notified.

If the pilot wishes to change his altitude or his flight plan, he will be able to query the ground stations by pushing an appropriate button. Approval or disapproval will be flashed back to his cockpit in a fraction of a second, since the calculations will be made by automatic machines on the ground.

This ultimate system, fantastic though it may sound, is designed to meet the everyday needs of civil and military aviation 15 years hence. It will, of course, solve the weather problems which plague aviation today, and it will permit aircraft to fly their schedules with clocklike precision and absolute reliability.

Furthermore, the RTCA system is designed with military as well as civilian requirements in mind. In case of war, the system will give instant warning of unfriendly aircraft, and permit interceptors to be vectored to attack. It will permit quick and heavy concentration of airpower anywhere it is needed within the country, and then assist in maintaining a continuous flow of supplies and manpower to the area.

This tremendous new program, on which the Army, Navy, Air Force and CAA are jointly agreed, will open the way for a whole new era of aviation in which the blessings of fast, safe, reliable low-cost transportation will be shared by every American citizen.

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AIRBORNE POLICE GUARD CITY'S SKIES

New York's "flying cops" are a sturdy crew. Based in a hangar on the windswept flats of Floyd Bennett Field in Brooklyn, the Police Department's Aviation Bureau operates on a round-the-clock schedule, in fair weather or foul, patroling the skyways and performing heroic life-saving missions.

Under the command of Acting Captain Gustav Crawford—a seasoned airman himself—six pilots and ten mechanics fly and maintain the four aircraft of the bureau—a Bell helicopter, two twin-engine Grumman amphibians and a single-engine Stinson land plane.

The Aviation Bureau is a vital adjunct of the Emergency Service Division, which mans the trim launches of the Harbor Precinct and the familiar jack-of-all trade trucks that are an outgrowth of the old "riot squads."

The flying arm of the division has come a long way since it was established in 1929 at North Beach Airport in Queens, now La Guardia Airport. . . .

In its twenty years, the Aviation Bureau has had its trials and tribulations —insufficient appropriations, obsolete aircraft, skeleton crews and the deadening lull of war years, which saw the unit reduced to a virtual nonentity. However, with modern equipment now at its command, the bureau has ended a not altogether happy era.

Maintains Daily Patrols

Today, it carries out daily patrols covering all five boroughs and makes surveys for the Traffic Division, spotting vehicular bottlenecks and reporting them by two-way radio to squad cars. Its aircraft also pluck wanted criminals from boats, take aerial photographs for the Board of Estimate, the Real Estate Bureau and other city departments, and transport top police "brass" and administrative officials to out-of-town meetings.

Prominent among its functions is the investigation of air accidents and the enforcement of Civil Aeronautics Administration regulations in the metropolitan area. Low flying aircraft—the trade calls them "buzz boys"— and stunt fliers are ripe targets for New York's airborne "finest."

Last year the bureau investigated 241 complaints of low flying, three forced landings and ten plane crashes. So far this year there have been eight investigations of low flying, three forced landings and six crashes.

The key function of these flying patrolmen, however, is search and rescue work on land and sea. These missions are carried out either in conjunction with craft of the Harbor Precinct or as independent operations. . . .

—reprinted from THE NEW YORK TIMES

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SOCIAL EFFECTS OF AVIATION

By LESLIE A. BRYAN

Excerpts from an article in AIR AFFAIRS

TRANSPORTATION by air in America has achieved an important and secure place in public transportation. During a short span of about twenty-five years the air transport industry has reached the status of big business. The chief characteristic of air transportation – high speed – has placed it as a transportation medium in a currently non-competitive position in circumstances where the utmost rapidity of movement is required. At the present time the transportation of persons is the primary source of income of the air carriers, although air mail revenue is still important and constituted the principal source of livelihood during the industry's early infancy and adolescence. In this respect air transportation development has differed somewhat from that of other forms of transportation, since from early times the latter derived their revenues mainly from the carriage of cargo.

Impact of Air Transportation

The general impact of air transportation upon all forms of surface transportation is quite appreciable already and probably will continue at an accelerated rate. Within the continental United States this impact has been and undoubtedly will continue to be felt most keenly by the rail carriers; particularly in connection with long hauls where the airport-to-airport speed outweighs the time consumed in traveling to and from the airports plus the actual travel time. Likewise, in transoceanic shipping the speed differential is considerably wider, because the fastest steamship moves with less speed and over longer distances than does the average railroad train. Consequently the effect of air transportation upon the merchant marines of the world may be profound.

Results have followed the introduction of air transportation in the United States, as they have followed any improvement of existing transportation. They can be conveniently grouped, although somewhat arbitrarily, under three general heads: economic, political, and social. Each of these results is important and undoubtedly there is considerable overlapping between them . . .

. . . In the succeeding paragraphs some of the social effects which the airplane may be expected to produce in the future will be discussed. Since the airplane is relatively new as a mode of transportation, the predictions which follow represent opinion, in many cases, though that opinion is fortified somewhat by the history of other modes of transportation and their social effects.

Effects of the Automobile

It may be profitable for the sake of analogy to review briefly many of the changes which resulted from an earlier invention whose development and social effects are known. The automobile is old enough and its effects are broad enough so that many of the ways in which society is different because of it are common knowledge. The automobile first of all revolutionized the prevalent mode of transportation. By eliminating to a large extent the use of horses and mules, it affected the industries which were directly dependent on animal transportation. Much passenger and freight transportation was diverted from the railroads to the trucks and buses. Likewise, automotive transportation affected the distribution of population, since with its development and with the coming of other forms of rapid transit, population tended to diffuse. The result was that the *economic* city and the *social* city became much larger than the *political* city and there developed the metropolitan area. Similarly, too, the coming of the automobile created a gigantic new industry and stimulated the oil, steel, and road building industries.

Institutions such as the school and the church, and national and local governments, as well as the customs and the habits of the nation were likewise directly affected. Thus, it is clear that the invention of the automobile affected civilization in many ways. The study of its influence illustrates two general facts: first, in order of time, invention comes first and the changes of society follow; and second, these social changes frequently require a considerable time before they develop into real adjustments. *Had the social effects of the automobile been foreseen in the early part of the century, profitable results would have ensued. Both the individual and society as a whole would have profited from the foreknowledge of an approaching social change.*

The question naturally rises – Can the changes which the development of a new mode of transportation in the form of the airplane will make in the near and distant future be foreseen? Without trying to make a prediction with mathematical certainty, it is possible to look ahead with some confidence to the probable effect of the airplane upon society—its customs, institutions, groups, and communities. All facets of our society will be affected. However only some of the more important can be mentioned here.

The Airplane and Population

Air transportation will have a good deal to do with the determination of the concentration and the spread of population. Aviation probably will have little effect upon the rate of birth and death in the United States, but it no doubt will have considerable significance in the distribution of the population in the world, as well as in the United States. The out-of-the-way locality, where minerals, chemicals, and other natural resources may be exploited, will be brought into contact with other population centers by the speed of air transportation. Similarly, too, the sparsely-populated regions lying adjacent to or on air routes between densely populated centers may be expected to increase in population. . . .

SOCIAL EFFECTS OF AVIATION—*continued*

Just as the development of aviation will influence the development of population in several territories, so it is expected to influence the configuration of the city. Changes of this sort will be slow. The first major change will occur from the demand for terminal-type airports, and for the small airport or landing strip for personal flying both in conventional airplanes and in helicopters. Demands for downtown landing strips and helicopter landing areas already have made themselves felt. It may be, too, that inland cities will increase in importance as they possibly become terminal points for international airlines. The threat of aerial bombing in a possible future war will make its influence felt in city planning and on the location of the new urban areas. Decentralization, of course, may not be limited to residential areas but may extend to factories and industries, as well as to public utilities and all forms of transportation facilities.

The Family

The family as a universal social organization was greatly influenced in the past by the development of the automobile and the railroad, and to a lesser degree by the development of water transportation. It is probable that the development of air transportation will not affect the family to as great a degree. The family, however, will be affected by the opportunity which air transportation will provide for more distant travel for family vacations. Air transportation will also tend to separate members of the family from one another, particularly through travel of the husband. Privately owned aircraft, as contrasted with the commercially operated airplanes, will probably affect only a relatively small segment of the population in the *immediate* future. The influence of such aircraft will be felt at first by families with large incomes. With the development, however, of airplanes that are cheaper and of greater utility the privately owned airplane may well become a means of conspicuous family display, provide for more vacations and vacation homes, develop problems of adolescent control, cause a readustment of family expenditures, and encourage suburban living.

The family will be affected not only as a unit of social organization, but also in varying degrees in its religious life, its health, its recreational ideas, and its education. Social effects may also extend to its newspapers.

Religion

Religion has two aspects—the institutional and the personal. The institutional aspect is, of course, the organization of religious belief into a formal structure. The personal aspect consists of organized informal and subjective phases of religion. Aviation can be expected to affect both aspects. Undoubtedly, the urban church will be affected by shifts of population due to the impact of aviation. Likewise, church attendance may tend to be decreased somewhat by the competition of private aircraft as such craft become more numerous. Contrariwise, the rural church may be strengthened to some extent by the pastor's use of aircraft to serve more than one church, or by parishioners using the airplane to travel longer distances to such churches. Missionary work and its administration will be facilitated and speeded through the use of private aircraft, and by the availability of commercial lines to carry administrators to and from the areas of work. Similarly, aviation may promote the movement toward international as well as national organizations of Protestant denominations. Two other results may be noted. Aviation will contribute to, rather than reduce, the trend toward secularization, and provide the means for the expression and encouragement of the more personal and emotional aspects of religion.

Health

Aviation will affect health in several different ways. In the first place, flying creates certain health problems which have led to a new branch of medical specialization, aviation medicine, and at least one new occupational disease, "aeroneurosis." Secondly, in the United States a new group of health problems have been created by the airplane through the importation of diseases from foreign countries. The spread of disease may come through the transportation of persons with contagious diseases or through the transportation of insect carriers of diseases.

On the constructive side there should be noted the successful use of the air ambulance and the speed with which patients can be transported by air from area to area, thus making feasible movements which otherwise would be prohibited, and thereby making more medical facilities available and possible, giving the patient a choice of them. Not only will hospitals and medical supply houses be able to extend areas of service, but also physicians practicing in medical centers or in their home locations may be able to circulate economically over more territory and treat more patients.

In recent years the movement toward the provision for more recreational facilities and activities has been an outstanding social development. Out of this movement has come a trend toward commercialization of recreation, and also a trend to use travel as recreation. This latter trend is aided very definitely by aviation which not only provides a new method of travel for recreational activities but also in itself affords pleasure to most persons. In this respect the airplane is quite similar to the automobile which has aided weekend travel and vacation travel to a marked degree. It is possible that there will be some sacrifice in the time given to automobile travel in favor of flying. Tourist travel in foreign lands and to remote parts of our country will undoubtedly be stimulated. On-the-spot motion picture making will be facilitated, of course, by aviation which will aid the frequent geographical interchange of artists and actors.

Sports

In the field of sports it is probable that the big spectacle events will be favored by aviation and the sports will come to have a wider base of operations through the ability of teams to travel longer distances for competition. Aviation as a sport may depress

(*Continued on next page*)

SOCIAL EFFECTS—*continued*

the growth of some other sports such as motor boating and sailing. On the other hand, those recreations which are correlated with aviation may be expected to definitely increase, particularly those outdoor sports, such as camping, hunting, and fishing, which require favorite spots of nature.

Recreation activities also may be expected to develop around airports. Observation rooms, parks, gardens, swimming pools, golf links, and restaurant and hotel accommodations now are becoming generally accepted as an integral part of airport activities. Such things are counted upon in many instances to help support the operation of the airport.

The effects upon education are among the most important social effects of aviation—a fact that is widely recognized, but upon which action has been discouragingly slow. In terms of its effect on the organized activities of schools, aviation can be expected to cause important changes in the curricula with scarcely a subject being untouched in some way. Significant modifications are to be expected in geography, physics, and engineering, with lesser effects in the social sciences, mathematics, biology, and geology. . . .

In the field of education administration, aviation will have an effect in the direction of strength of the influence of the larger administrative units. Aviation will tend to increase the size of the great universities and influence the location and specialization of schools. The effect of aviation on rural education will probably be slight.

Some of the economic, social, and political changes which may be expected to follow the development of air transportation have been outlined briefly above. In summary, all point to the fact that many social changes will follow the introduction of the airplane. Careful planning can eliminate many of the costly errors and much of the social lag caused by a disregard of predictable results of the technological changes caused by the introduction of air transportation.

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THE EFFECT OF AIRPORT DEVELOPMENT UPON THE CITY OF DENVER

Does airport development impair residential opportunities in neighboring sections of a city? The answer appears to be "No," according to the findings of the following survey by the Denver University School of Aeronautics.

A SURVEY showing the effect of airport development upon property values and direction of growth in the city of Denver, Colorado, is presented herein. This study includes a brief history of the four main airports and background data indicating trends of expansion in four Denver areas, Northwest Denver, University Park, East Denver, and Crestmoor. The development of the City of Aurora was measured by the increase in the number of utility connections. . . .

In determining the possible effect of flight operations upon real estate values in the areas adjacent to the airport, data on real estate values in East Denver and Aurora, the area within which the principal airports are located, was compared with like information for the University Park and North Denver areas. The percentage of yearly increase in real property values was obtained through the use of a questionnaire presented to 574 householders in the five areas. The houses selected for this sample were based on similarity of size and type of construction. . . .

In order to obtain a voluntary and unbiased opinion, no mention was made of the purpose of the survey. . . .

History of the Airports of the City of Denver

Stapleton Airfield. The original 640 acres of land on which Denver's municipal airport was built, (the field was not named Stapleton until about 1943), was used for dairy farming by Mr. Brown Cannon. It was purchased from him for $20,000. When the field opened in the summer of 1929, it boasted of mile long black-top runways in each direction, an administration building, a fire house, and one fireproof hangar approximately 150 feet square. The lighting was said to be the best in the country.

Today, because of municipal and federal extensions, Stapleton Airfield is valued at $10,000,000, or nine and one-half million more than its original cost of $500,000. With the completion of current improvements, such as the new east-west runway, extensions to the administration building, removal of obsolete hangars #1 and #2, its value will be increased to $13,500,000.

All of the commercial carriers operating in this area utilize the facilities of Stapleton Airfield. These are United, Continental, Braniff, Western, Challanger, and Monarch Airlines. Many small operations of flying, sales, flight training, and non-flying services are carried on at the field.

The present value of this land is between $1,500 and $2,000 per acre.

Lowry Air Force Base. The three main buildings of the present Lowry Air Force Base were originally the Phipps Sanatorium, a private institution for tubercular patients. In 1939, this area was purchased by the City of Denver through a bond issue, and given to the Federal Government.

Since its establishment, this field has received extensive and costly improvements. It serves as a base of the Air Forces Technical Training Command, and other Air Force operations. The total area, runways (concrete) and operations facilities are more extensive than those at Stapleton Airfield.

The property value of this area is approximately $2,000 per acre.

Combs Airfield. The field was built soon after World War 1 and was used by the 120th Observation Squadron of the Colorado National Guard until 1937. It was the original Lowry Field, and was sold to the Evans Investment Company when the new Lowry Air Force Base was built in 1931.

Mr. Combs and his associates bought

CITY OF DENVER—*continued*

this 360 acre tract of land in 1942, for $300 per acre. The field was used for private planes and flight training until late in 1948.

Vest Airfield. This field was built shortly after World War I by Curtis Wright. At the present time, Mr. Vest leases the property from the Evans Investment Company. He operates a private landing field, aircraft sales, and student training school. This tract is about the same size as Combs Airfield, and, because of its location, could be valued at about the same price, or $2,000 per acre.

Because the area is surrounded by oil refineries and many small industries, it is probable that it will be sold for industrial expansion in the near future.

Findings — Conclusions — Recommendations

The growth of Denver's East area over the other areas surveyed indicates that the airports have had no apparent adverse effect upon the expansion. . . .

Employment at the airport has tended to attract employees to the East Denver residential section. Of the 179 contacts made in East Denver, thirteen percent worked at one of the two airfields. Out of the eighty-eight contacts made in the City of Aurora, thirty-four percent worked at the airports. The remaining three districts — Crestmoor, University Park and Northwest Denver—reported that only one percent of the persons contacted was employed at an airfield. . . .

The presence of airports changes the general land use of the surrounding area. Stapleton and Lowry have both taken large tracts of land in each direction for expansion of airport facilities and for the purpose of erecting buffer areas on their immediate perimeters. The City of Denver has zoned much of the property surrounding the airports into Class A residential areas, thus preventing further development of the area for non-residential purposes.

Information obtained through the survey indicates that if the present building trend continues, it is altogether possible that the entire eastern section of the City, with the exception of the area north of the airport, will be used for middle class homes and for small retail businesses.

It is expected that the northwest section will rapidly develop into an important trade and shipping area because of its accessibility to the railroads and highways running to the north and east. This trade area might become of some importance to the air carriers as they cut deeper into the cargo and freight fields.

Classification of Complaints

In the process of questioning the 574 householders, in all areas, we received 277 voluntary complaints concerning nearly all the phases of everyday living. . . .

The general lack of efficiency in the city maintenance of streets, alleys, and trash disposal showed the highest number of all the complaints among the 574 contacts. Airport operations was second in the three areas adjacent to the airports. An interesting fact was brought out when we specifically asked forty-nine householders in the areas adjacent to the airports whether or not airport operations bothered them — eighty-four percent of these stated that they were in no way inconvenienced by airplane activities.

This project was organized by a committee consisting of Mr. Charles Lowen, Director of Aviation of the City and County of Denver; Mr. Willard J. Bain, Director of Aeronautics, State of Colorado; Mr. R. D. McDonald, District Airport Engineer, C.A.A.; Mr. F. L. Carmichael, Director of the Bureau of Business and Social Research of the University of Denver; and Mr. Merlyn McLaughlin, Director of the School of Aeronautics, University of Denver.

This study was started by a seminar group of the School of Aeronautics, University of Denver, during the Summer Quarter, and completed during the Fall Quarter, 1948.

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NATIONAL AIRPORT PLAN FOR 1949

THE 1949 National Airport Plan listing 4,977 locations at which airports should be constructed or improved on the basis of existing and anticipated demands for air service has been announced by D. W. Rentzel, Administrator of Civil Aeronautics.

This, the third in a series of such annual reports, was prepared by the CAA in accordance with the provisions of the Federal Airport Act of 1946, which requires the Administrator to prepare and revise annually a three-year forecast of projects considered "necessary to provide a system of public airports adequate to meet the needs of civil aeronautics."

Of the 4,977 locations listed in the 1949 Plan, 2,794 are for completely new airports while 2,183 are for improvement or development of existing fields. Although the Plan does not represent an allocation of funds, the estimated cost of the construction and development outlined in the Plan would be $1,115,300,000, of which $510,600,000 would be in Federal funds and $604,700,000 in funds provided by the sponsor. On the basis of the appropriations to be made by Congress, CAA will program for the coming fiscal year the most important locations in the Plan.

The 1949 Plan lists a total of 567 Class IV and larger airports, of which 24 would be new and 543 for development; a total of 608 Class III airports with 165 new and 443 for development; a total of 1,048 Class II airports with 474 new and 574 for development and a total of 2,358 Class I airports of which 1,777 would be new and 581 for improvement. In addition the Plan lists 291 new seaplane bases and improvement of 40 others and 63 new heliports and improvement of an additional two. . . .

Copies of the 1949 Plan may be obtained from the CAA Office of Aviation Information, Washington 25, D. C.

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INDUSTRIAL FLYING

Excerpts from a booklet issued by the Civil Aeronautics Administration to suggest possible uses of the airplane. "Industrial Flying" includes all operations of the airplane not connected with the scheduled or non-scheduled transportation of persons, mail and freight; student instruction, or pleasure flying.

CERTAIN uses of the airplane in agriculture have a history of 20 years or more. The first efforts at control of insect pests by dusting from the air occurred in Ohio in 1921, when an infestation of caterpillar pests on catalpa trees was attacked and destroyed. From there, the practice spread in wide circles geographically, and in all the directions which the minds of ingenious pilots could travel. Today, spraying and dusting of crops from airplanes is an accepted practice, extending rapidly into other fields.

Several sections of the Department of Agriculture are actively studying use of the airplane in control of insects which attack crops and forests, and are developing special air-spread poisons and special equipment for their utilization.

In parallel lines, other uses of the airplane have developed until now there are several activities that can be considered as having "arrived." These are established businesses, producing steady revenues for their operators and rendering valuable services to their customers. The broad categories of these businesses are Dusting and Spraying for Insects, Plant Disease, and Weed Control; Seeding and Fertilizing; Mosquito and Grasshopper Control; Aerial Photography; Patrolling; and Advertising.

There are many uses of the airplane more novel and of more recent development; some bear considerable promise, and all of them have awakened the imagination of aircraft operators. These are the "stunts" that have been played up in the newspapers but, inasmuch as the first aerial photograph and the first aerial dusting were "stunts," these novel uses must be considered important. Such "stunts" as rain making, ore and oil prospecting, and the pick-up or delivery of awkward loads to inaccessible places by helicopter, already are growing into the dignity of developing commercial enterprises. Many others still are in the "stunt" stage; but the young American pilot is aggressive and full of initiative, and anything can happen.

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Operational Uses of Airplanes

"Stop Drop" Sprayed on Ripe Fruit
Plant Pollinization
Crop Defoliation
Dusting • Spraying • Seeding
Sign Towing
Glider Towing
Mapping and Surveying
Aerial Photography
Forestry Patrol • Highway Patrol
Powerline Patrol • Pipeline Patrol
Oil Well Service • Soil Erosion
Ambulance Service
Delivering Mail—Newspapers
Dropping Food in High Snow Period
Patrolling Fences
Checking Cattle
Hauling Food and Equipment
Mineral Prospecting
Game Survey
Coyote Hunting • Eagle Hunting
Hunting Lost Persons
Herding Wild Game
Measuring Snowfall and Water Levels
Game and Fish Patrol
Telephone Line Patrol
Skywriting
Blimp Advertising (Neon Lighting)
Loud Speaker Airborne Advertising
Rainmaking • Mosquito Control
Spotting Schools of Fish
Stocking Lakes and Streams with Fish
Air Police • Trapline Patrol
Fur Transportation
Forest Fire Fighting
Herding Livestock
Helicopter Operations
Checking Fallow Land
Anti-Frost Agitation
Checking Crops • Oil Search (Radar)
Spreading Fertilizer
Checking Windmills and Waterholes
Checking on Dam Sites and Irrigation
Oil Company Business Transportation
Weed Control

Copies of the complete booklet may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. at a cost of 10¢ each.

"KITE" HELICOPTER

One of the oddest German developments of World War II, a "kite" helicopter that was towed behind a submarine, is being tested for the US Air Force by the Cal-Aero Technical Institute, Los Angeles, Calif.

The small craft consists only of an open-air seat on a single piece of tubing, below a three-bladed rotor that is turned by a relative wind of seventeen knots or more. The speed of the submarine, combined usually with a light-to-strong breeze, was enough to lift the Nazi "kite" off a U-boat's deck once the blades had been given initial rotation by a hand crank. Then the helicopter soared upward in back of the boat, carrying its single passenger to heights of 500 to 1,000 feet. The submarine could be contacted by telephone, and safety features included a device that would break away the rotors and spring open a parachute for pilot and "fuselage." In case of danger to the boat, the observer could be cut loose by the submarines.

The kite can be knocked down to a compact package and stored in the submarine. Helicopter pilots find it easy to fly, and it is believed that several crew members on each submarine were capable of operating the aircraft.

—reprinted from AMERICAN HELICOPTER

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100,000-Pound Load

Convair's giant XC-99 transport, the largest plane in the world, has taken off successfully with a 100,000 pound weight load—the largest ever lifted by an aircraft.

—from an AP *news dispatch.*

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MY HOP AROUND THE WORLD—*continued*

Night fell on that first day—Saturday—and we were boring along over the Atlantic, after crossing the coast 15 miles north of Washington. Radar Officer Lieutenant Roland Bonner said, "I wonder how many of the boys there are sweating us out."

The significance of the flight still hadn't dawned on me in the excitement of getting started, and I kept thinking of things I had forgotten to do, like paying the rent and phoning Mary, who had gone to her uncle's in New Orleans for the Mardi Gras. I wondered if I would get back in time for the ball on the last day of the Mardi Gras. Then it occurred to me that I might not get back at all – or that I might spend the next few weeks wandering around the Arabian Desert or a Pacific jungle.

At eight o'clock the next morning (Sunday) I heard a yell from Bonner on the interphone. He had picked up an image of the first pair of tanker planes (they had been sent out ahead from our group) waiting for us over Lagens Air Force Base in the Azores. Soon we were in radio contact with the tankers, and I tossed the banter back and forth with Lieutenant Dorman and Captain Bowley, pilots of the two planes looming up alongside.

I got apprehensive again about having all that high octane so close, but before I knew it Dorman's plane had made contact and the gas was pouring into the tail of the Lucky Lady.

At this point, disaster nearly struck. After the hookup was made, Sergeant Melvin G. Davis, one of the gunners, got his finger caught in the heavy winding mechanism we used to reel in the hose. That would have been the end of the finger, if the other gunner, Sergeant Donald Traugh, hadn't acted quick as a flash. Traugh yanked a lever which stopped the mechanism in a split second. While the fellows in the rear of the plane held their breath, Davis extracted his finger from the machinery. It was badly bruised but still serviceable.

When our tanks were full again, we said good-by to the tanker crews. We kept speeding west, passing Gibraltar. It was overcast, but on Sunday afternoon the sun broke through and we could see the seemingly uninhabited coast of North Africa down below us.

This stretch was dull. We began to experience that unending feeling of cramp in our legs. The two gunners tried to read, but they ended up just nervously watching the rear of the engines for the smoke or the flames that would be the first hint of trouble. The rest of us worked at our jobs or tried to sleep. At this point, George, our automatic pilot, was doing most of the work.

A Tanker Captain's Gripe

We roared into Sunday night, our second night in the air. We got depressed, until suddenly it was Monday morning and the voice of Lieutenant Willie Sontag was booming into our radio. Sontag and Captain Slipp were pilots of the two tanker planes that had been sent on to Dhahran, an air base on the east coast of Saudi Arabia. Sontag said, "You son of a gun, you got me out of bed an hour ahead of time." I looked at my watch. We were beating our schedule by an hour.

I knew Sontag well, and the refueling went without a hitch, except that he cursed me for running him into a thunderstorm. Sontag wished me luck and said good-by. Then he turned and headed back into the overcast. We were alone in the sky again.

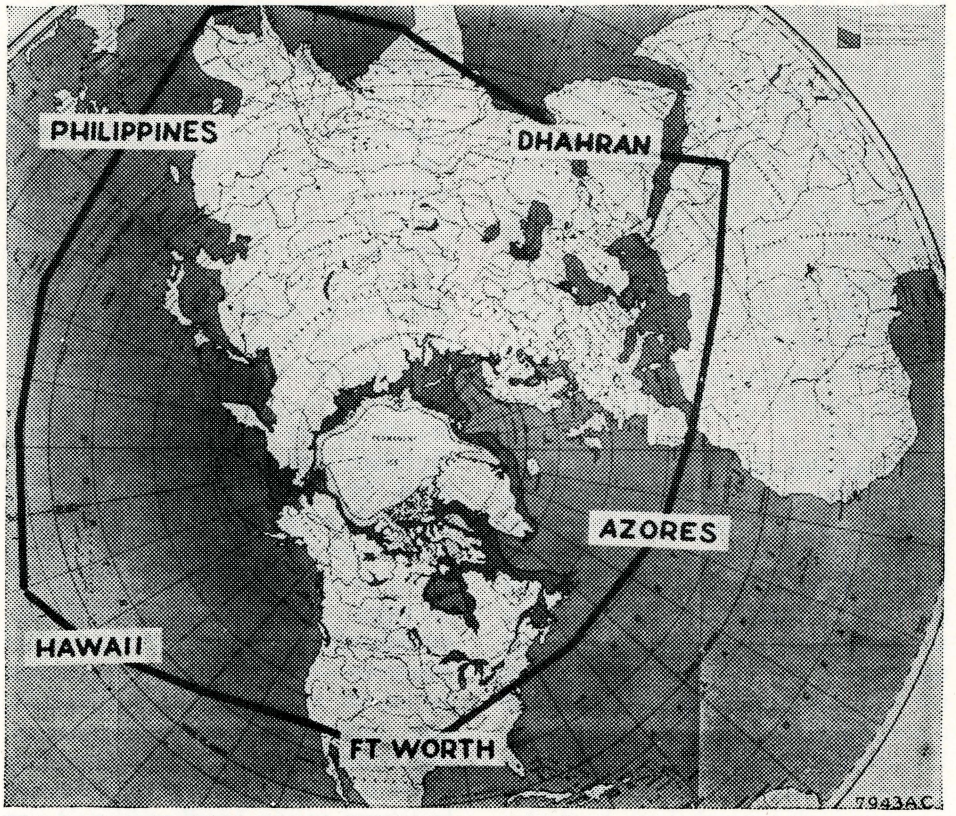
For me, this next leg of the trip was the strangest. This was the part of the world where I had flown combat during the war. The men caught the excitement, too. They looked down at the little villages of India, with their hosts of fires burning at night, and they got restless. For some strange reason, everyone shaved and bathed, using a washrag and basin. Flight Engineer David Parmelee turned to one of the other men and said, "Where the hell do you think *you're* going?"

"There's that babe in Calcutta," the man answered, "and you never know."

We still didn't dare to hope that we'd make it all the way round the world.

Then came the Bay of Bengal and the Andaman Islands. I remembered that the Andamans were one of the few places on earth where there still are working cannibals, and how during the war we had been briefed to find caches of food and guns left there by British submarines in the event we were forced down.

(Continued on next page)



The Lucky Lady flew east over this route around the world, refueling in mid-air at points named.

U.S. AIR FORCE PHOTO

Radio Operator Sergeant Burgess G. Cantrell had dance music from Singapore on the radio at this point, but it didn't cheer me up much. I remembered how every time we flew to bomb Singapore, we passed through a squall over the Strait of Malacca. You always could see the lightning in a straight line from over 100 miles away—and there it was again. We passed to the north of the storm, a luxury we couldn't afford during the war because it would have used up too much gasoline.

Fifty hours after we had left Fort Worth we were past the tip of French Indo-China. I thought of a raid we once had made on Saïgon, after Intelligence had told us about a big Jap staff meeting in a certain hotel at a certain time. We bombed the hotel with our B-29s, but I never knew whether we actually had scored a hit or not, and I thought—not seriously—of flying off our course to have a look and find out.

It was Tuesday morning, and the hours were piling up—55, now, since we had left Fort Worth. Next refueling operation: the Philippines.

Our third refueling came off perfectly. Lieutenant Dolan and Captain Fuller piloted their tankers up from Clark Field to meet us. We still were on schedule. Fuller's last words were about seeing us at our home base on Friday. He didn't keep the date. His plane crashed somewhere in the area after the refueling operation was over, and at the time of this writing his crew was listed by the Air Force as missing. Damn' fine men!

Beyond the Philippines were more memories. We flew just north of Tinian, from which jungle paradise I had made 20 missions against Japan, after my 15 missions in the China-Burma-India area.

We headed toward our fourth and last refueling over Hawaii, and the tension began to mount. We had been in the air over 60 hours now, and we were beginning to let ourselves realize that after just one more refueling, we might make it. Things were getting tough aboard the plane. Our navigator, Captain Glenn Hacker, developed a bad head cold, and the pressure on his ears got painful. Soon the pain spread to his throat (he kept doing his usual fine job, nevertheless). At the beginning of the trip, the engines had been hardly audible to us in the soundproofed pressurized cabin, but now the noise seeped through to torture us, especially when the propellers bit harder into the air when we climbed.

The air in the plane got musty. I heard Lieutenant Caffrey say, "I always intended to go around the world and see all these countries, but I sure didn't think I would do it this way."

We passed Wake Island, and the radio operator there didn't believe it when we told him we were going on to Hawaii. Then we passed the international date line, and after flying all day Tuesday, we were back in Tuesday again. As Bonner, our radar officer, put it, "We are going into yesterday now."

We discussed this at great length (like all Pacific tourists), and I made the observation that since we were traveling at one quarter the speed of the earth as it made one complete 24-hour rotation, we were picking up a quarter of a day each 24 hours, and that we would be the only people on earth to see five sunrises in four days. We beat *this* subject to death, and with this sort of rumination to keep us occupied, it soon was Tuesday afternoon and Lieutenant Hagan and Captain Hamilton were there from Hawaii to give us our final load of gasoline.

When our tanks were filled without a hitch, the heat really was on us. As Bonner wrote in his diary, "The crew is really sweating it out now because we're so close and yet so far from completion." Just 16 hours to go! Nobody slept much any more and the conversation died. As the expression goes in the Air Force, we were so tired that "our eyeballs were hanging out."

Early in the morning of Wednesday, March 2d, our radio brought in a San Francisco radio station, then Los Angeles. We thought the coast would never come, and we jumped every time Bonner or Caffrey spoke, thinking they had a picture of the coast in their radarscope. Finally they did pick up something, but it was a big, hairy thunderstorm. Our wings got covered with ice as we went through the disturbance, but I turned on our wing-warming equipment, and the ice melted away. I thought of what a menace ice had been to the Lindberghs and the Clarence Chamberlins, and how easy such problems were for us today.

At 3:00 A.M. Caffrey yelled, "There she is!" and it was the coast line between Santa Barbara and Los Angeles showing up in the radarscope. I'm sure that the cry "Land ho!" didn't sound any better to Columbus. We roared in over California just before dawn, and I kept praying, "Please, please, please don't let anything happen now!" The men were excited and yelling.

It was raining in California and we could not see the ground. As soon as we left California we broke through the overcast and saw the sun shining over Arizona. We also saw three tanker planes from our outfit which had been sent to escort us in. The men started to shave, Hacker using a straight razor. The tanker planes gave us a constant stream of chatter over the radio, cheering us on. They said, "Wha' hoppen?" "Are you getting any sleep?" and "Those engines sure are dirty."

As we headed toward Fort Worth, our take-off point, Neal said, "What a country this is! Smooth air, weather information, radio beams!" I mentally agreed with Neal about what a great country this is — but for different reasons. Here I was, the son of an Irish immigrant locomotive engineer, a kid who was a $35-a-week clerk in the government before I enlisted in the Air Force during the war. I had no rank, no connections, no West Point background, not even a college degree—yet they had allowed *me* out of thousands of thousands of Air Force pilots to command the first plane crew in history to fly nonstop around the world.

I vowed not to let this give me a swelled-head hero complex — and to consider the flight merely a routine four-day job that contributed something to the advance of aviation.

I knew there wasn't much chance of getting this swelled head when I put the plane down at Fort Worth exactly 94 hours and one minute after I had taken off. My auxiliary generator was out of commission, and I took longer than usual coming in. The first thing I heard was that Lieutenant General Curtis E. LeMay, standing among a crowd of brass and celebrities, had said, "He's been up there so long, it looks like he's forgotten how to land."

Reprinted from COLLIER'S

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INTERNATIONAL AIR TRAFFIC CONFERENCES

Several months ago, SIR WILLIAM P. HILDRED, *Director of the International Air Transport Association, addressed the Aviation Writers Association on the subject of IATA's traffic agencies. Excerpts from this talk are reprinted here because of the current interest in international air rates.*

I HAVE seen Americans in Europe, in England, in Bermuda, in South America and the Middle East, learning something about those lands and teaching their inhabitants something about America. I am anxious to see the day when this sort of thing will be part of the education of every school child — when Swedish children will visit Canada, Dutch children go to Brazil and South Africa exchange scholars with France. It will come slowly but surely if we give aviation its head, if we cut out all needless obstructions, tailor-make our aircraft, train air and ground staffs to a hair, and if we strive mightily to see that we get a complete world pattern of unified and simplified documents, procedures, devices and practices.

But meanwhile the services which air transport renders now and which it hopes to render in the future must somehow be paid for. The public thinks of things in terms of end results, and one of the first end results they think of is: how much does it cost? . . .

I can think of a case where the fare on VE Day was over $500. Had it been left to the operators unilaterally to handle the matter, each calling upon his own government for subsidy in one form or another, and no one consulting his fellow-operators, the fare might have come down to a lower point than where it stands at present—indeed, the operators might have been giving their tickets away free, with a grandfather clock and a bottle of brandy as inducements. In fact, we might now be in the middle of that tragic and evil thing, a rate war.

Dangers of Rate Wars

A rate war is a drain on Treasuries. It is a danger to society because it means the airlines would have to cut corners in order to knock dollars off. It would take its effect in poorer maintenance, poorer training, poorer service, poorer food, shorter fuel margins. That would have spelled death. It makes bad blood between operators; it makes bad blood between governments; and it gives a spurious and entirely mischievous impression to the travelling public. It induces a false consumer demand, which has immediately and tragically to be checked when the bankruptcies start. . . .

Don't run away with the idea that a rate war is a synonym for keen and healthy competition. Don't think that a rate war is the finest expression of American pioneering enterprise. Competition is there all right in air transport — and always will be. The public five years from now, or ten years from now, will still be exercising a nice discrimination in going by the airline which treats them best, has the most entertaining methods of treating and feeding passengers, which runs to the clock, and which has the best reputation for reliability. And that is not the airline that pares down the costs of operation too far.

One of the first things I heard said when I came into aviation was that the weakest Treasury of the weakest country had a longer purse than the wealthiest private company or corporation. In this case of which I speak, a contest between the two was a definite possibility. The airlines and their governments had virtually reached a stalemate and all of them were shuddering on a dangerous brink, needing but the slightest push to make them go over. This went on for a period of months. . . .

But mercifully, we did not have a rate war. The operators got together in the interested zone and made a determined effort to recommend a rate not too desperately bad for themselves and good for the public.

Steady Rise of Commodity Prices

With the steady rise of commodity prices in all the countries bordering on the zone I am talking about, the purchasing power of a pound sterling, or a French franc, or a Dutch guilder, or a Swedish crown, or an American dollar or a Canadian dollar, had steadily gone down. So that anyone who was selling a commodity at a fixed price expressed in these currencies was, in fact, selling that commodity at a lower price. Air Transport is a commodity which can be bought and sold —just like a pound of butter or a gramophone or a set of dentures.

I have said before, and I repeat it, that in fact wholesale prices rose on the average by 30 per cent in the two years following the end of the war. Over the same period, passenger air fares on this route were reduced by 13 per cent and, if we take the fare actually current when the war ended, by no less than 43 per cent. In other words, the travelling public has been offered a reduction of something like 40 per cent in the absolute cost of an Atlantic trip in the space of two years, or over 60 per cent if you take a period of slightly more than two years. . . .

Can Reductions Keep Up?

The question is can the operators afford to keep up this rate of reduction in price? Can they hope to win the race between the continuing rise in general costs and their own relative and steady reduction in operating costs? Can they, by increasing frequencies, beat down the effect of increasing wages for labor and the increasing landing and ground charges demanded at the airports which they use? I don't know.

IATA Conferences are very reluctant to raise any prices in terms of money, but the race is desperately close; and in having to recommend an increased rate recently on the Atlantic, the operators took a course they did not like because it was susceptible of misinterpretation; yet it was vitally necessary in any comparison at all. Have you watched the trend of prices over the last 30 months for the commodities you have to buy?

Moreover, I must point out to you that passenger tickets constitute only one of the three items of an airline's stock in trade. The Conferences must

(*Continued on page* 16)

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AIR TRAFFIC CONFERENCES—*continued*

also deal in cargo and mail. . . . Cargo rates have been made more attractive to business, while what the public has had to pay — out of national treasuries, if not in the cost of postage stamps — has gone down, too. I might also observe that had not the price of one item in this stock in trade been adjusted, the public would be paying the difference inevitably in one of the other items.

May I say a few words about the rate-recommending machinery of IATA and the practical steps taken in these autonomous Traffic Conferences? . . . .

Three Conferences

There are at present three Traffic Conferences — the Western Hemisphere, Europe-Africa-Middle East, and Asia Australasia. Every IATA member operating international services within a Conference area is a voting member of the Conference. . . . The Conferences draw their authority from the Annual General Meeting of IATA. They are administered from IATA's Head Office. They receive recommendations framed from a worldwide point of view by the IATA Executive and Traffic Committees. The regulations governing their conduct are submitted for the approval of Governments. But as far as IATA is concerned, the Conferences are autonomous. As a private organization, IATA could not pass finally on recommendations which became effective only by government approval. But they were manned by people who were determined to make Conference procedure work; who had seen what happened in other spheres which had tried to do without it.

In these Conferences each carrier has a single vote, but that vote is important, because the Conferences are governed by the rule of unanimity. Any carrier which believes a resolution to be unfair or undesirable can, by a single negative vote, throw the resolution out. . . .

Other Matters

Rates are by no means the only matters which the Conferences consider. What else they do—and the way they do it—can be summed up by quoting from a recent CAB opinion:—

> "During the past two years, the various Traffic Conferences of IATA have held 23 meetings and adopted several hundred resolutions which cover a wide range of matters, including rates, terms and conditions of carriage, reservations and booking procedures, relations between carriers and agents, and other co-operative working arrangements for the handling of traffic. In the non-rate field, the great majority of the resolutions so far considered by us reflect favourably upon IATA which has, in a relatively short time, succeeded in establishing procedures which will not only reduce operating problems of the individual carriers but which will directly benefit the public by facilitating the international movement of passengers and cargo. There appears to be no more effective way by which these desirable objectives could be accomplished than through the machinery of an organization such as IATA."

The Net Result

. . . The Traffic Conferences have so far worked well. Application of Conference procedures to all world routes has had to be accomplished by stages, but it was completed early this year; and we are not far from a worldwide rate structure. Despite the inflationary price trends throughout the world which I have mentioned, the Conferences have generally held the line on passenger rates, reduced many, particularly in cargo categories, and raised only a few. . . .

The proof of the pudding is not so much in the eating, but in the way the eater feels after digestion has begun. The net result to date has been that, despite all the manifold parties interested and despite all the complex problems involved, the governments, I believe, regard the Conferences with an increasing degree of trust. And the user of international air transport service — the man who counts most — is travelling a good deal further today for less money than he paid two years ago.

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