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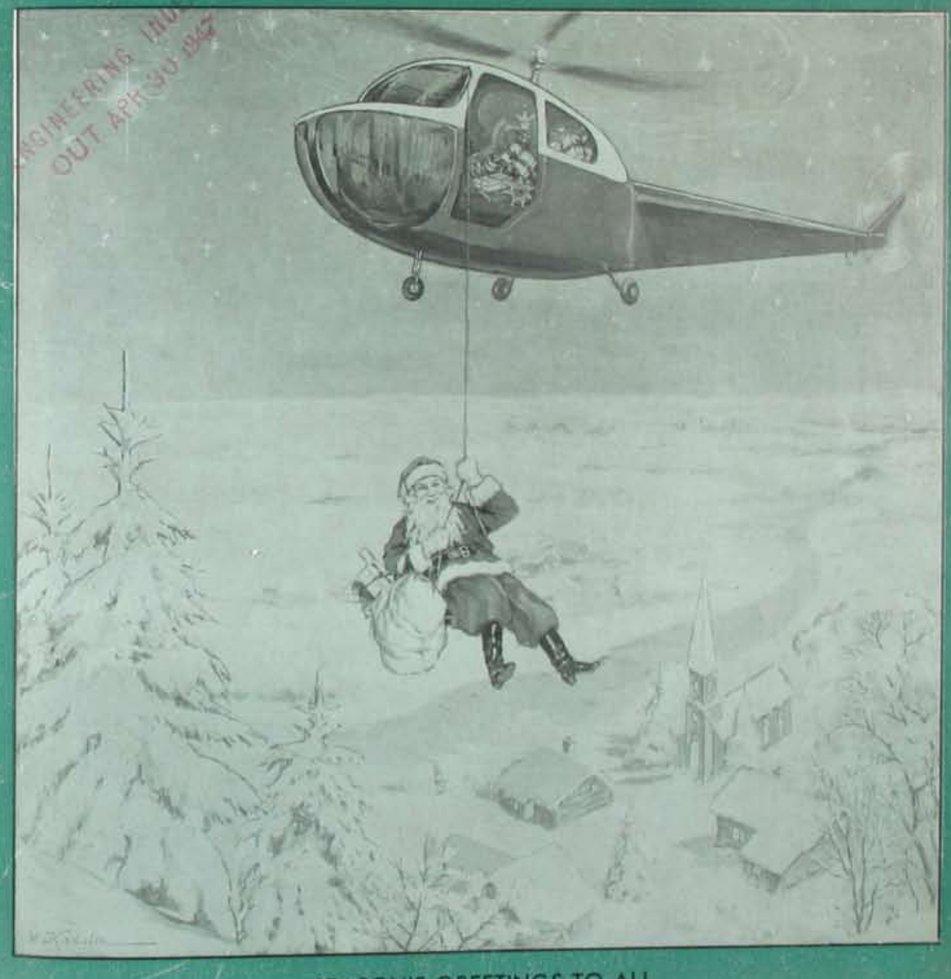

SEASON'S GREETINGS TO ALL

DECEMBER, 1946
VOLUME 5 - NUMBER 1

AMERICAN HELICOPTER

MAGAZINE OF ROTARY WINGS - AVIATION - AIRWAYS

COVER

SEASON'S GREETINGS TO ALL—A Drawing by V. Kadulin

FEATURES

PICTORIAL

DEPARTMENTS

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Rescue team assists injured survivor into helicopter, preparatory to 7 mile trip to Wolf Lake and transfer to waiting PBY.

St. Martin ...In The Woods

by Joe Martin
New York Daily News

THE blue and white Catalina banked under the low, leaden skies and drifted slowly over the desolate hills. The ship's crew strained their eyes on the dense forest below. Every man was tense and quiet. They were waiting for word—a voice that was to come out of the wilderness beneath them—of the fate of forty-four passengers of a Belgian "Sabena" airliner that had crashed some thirty hours earlier.

Then they heard it. The voice of Lt. James Christian crackling through a walkie-talkie from the ground: "We're in. They're hurt bad, very bad. There's eighteen alive—or half alive. Some will die if we try to carry them out."

Thus began one of the most dramatic and spectacular rescue operations in the history of modern aviation. A story of a Metal Angel of Mercy—of a machine brought forth from the dreams of man that was destined by the fates for this life-saving mission.

Within an hour the news had been flashed by radiophone to New York—and the world—that there were people alive in the charred grave the airliner dug for itself when it plowed into a lonely Newfoundland hillside, twenty-two miles southwest of Gander Airport. The victims were horribly injured and burned by the fire that followed the crash of the huge airliner. The faces and bodies of many bore great blisters and patches of raw flesh. Others had been torn by flying bits of the metal fuselage of the ship as it shattered itself in a five hundred yard plunge through the dense spruce trees. The chill winds and driving rain that had beat down on the injured for thirty-six hours following the crash added to their misery.

Many of them would not survive unless they were snatched at once from the wilderness to the sanctuary of a hospital—they needed warmth, medicine, and the hands of surgeons. Furthermore, some of the survivors were in such a critical condition that a trip of any distance on a jostling litter would be fatal. Capt. Sam Martin, the Army doctor from Ft. McAndrew, Argentia, was sure of that. So were the other fourteen members of his Army rescue party that had reached the scene with Lt. Christian. Medical authorities at the Sir Frederic Banting Hospital, Gander Airport, later supported Capt. Martin's opinion that many of the victims "could not have survived another night in the forest."

The area in which the airliner crashed—ironically, is located in the "twilight" zone of the south-west radio beacon—is one of thickly wooded spruce, rocks, and Newfoundland muskeg. Native hunters and guides estimate one mile per hour as the best distance a man can make through the boggy muskeg.

The nearby Southeastern Gander River, which might have provided a water avenue of escape for the survivors, is studded with rocks and rapids. The Army rescue party reached a spot within three miles of the scene by way of the river, but only after their rubber boats had been upset many times by the racing waters. Thus, to return the survivors to civilization by boat was impossible. To carry them out on litters would have fatally exhausted their waning strength. They had to be "plucked" out of the wilderness. There was only one means known to man that could effect the miraculous rescue necessary to save those gripped in the horror of slow, agonized death—and that was the helicopter.

At once emergency calls went out over the Army's vast communication system. Army, Navy, and Coast Guard stations of the Eastern Seaboard were speedily checked for 'copters. The Coast Guard Air Station at Elizabeth City, N. C., reported back, "Preparing R-4 helicopter for delivery. Will fly it to Floyd Bennett via cargo ship." The Coast Guard Station at Floyd Bennett Field, Brooklyn, wired Gander: "Tearing down our R-6. Will fly it and the R-4, enroute from North Carolina to you in a C-54."

Expert mechanic crews worked on the R-6 steadily for five hours—with a brief interlude for "chow"—and loaded it aboard the C-54. In the meantime the R-4 had arrived at the Base and was put aboard the cargo ship.

Lt. August Kleisch, of Cincinnati, Ohio, and Lt. Walter Bolton, of Milton, Mass., along with a crew of eight mechanics climbed aboard the C-54. At 12:05 AM, Saturday, September 26th, Major O. H. Skinner 'gunned' the engines. A few minutes later the eyes and ears of the world were following the silver ship on its 1,100 mile dash through the night skies to Newfoundland.

A little less than six hours later the ship dropped out of the clear, blue Newfoundland skies onto the runway of Gander Airport. Skinner taxied to a stop in front of hangar No. 1.

The mechanic crew from Floyd Bennett, assisted by base mechanics, started the job of reassembling the 'copters. The job was completed in approximately three and a half hours. Final assembly of the R-4 was delayed by a fabric tear in one of the vanes.

At 1:30 PM the silver R-6 helicopter model was rolled out of the hangar onto the ramp. Lt. Kleisch checked the controls. A battery cart was plugged into the ship. The engine coughed, caught, roared into life. Thirty-five minutes later the helicopter was airborne and moving south across Gander Lake, bound for the first survivor waiting on the marshy plateau twenty-two miles away.

A wooden platform had been set out on the muskeg covered plateau to prevent the belly of the ship from sinking into the bog and blocking the carburetor air intake. Nothing must occur that would cost precious minutes. In spite of the planking the ship started to settle. Before Lt. Kleisch could shout a warning, alert GIs at the scene, saw the danger and quickly reinforced the crumbling platform.

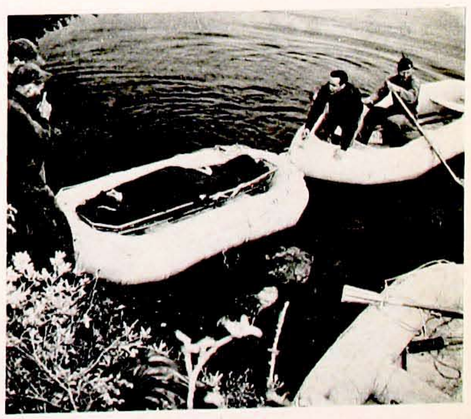
Before setting down on the plateau, Lt. Kleisch hovered for a minute over the fire blackened crash scene. He said later, "It seemed as if I could hear their shouts of joy. All their faces were turned up toward the ship." Their rescuers said some of the injured wept at the sight of the helicopter. Thus were realized the words of one survivor, Mrs. Renee Jaquet Libert, of Belgium, who had said with unwavering faith in the face of death, "I knew the Yanks would come to save us with their ingenuity."

As the litter carriers, bearing the first survivor to leave approached the 'copter, someone said to Kleisch, "It's Jean Roocki, the stewardess. Capt. Martin had to argue like hell with her to leave. She feels the passengers should get out first. She's one of the most seriously injured."

The carriers gently slid the stokes' litter through the special opening that had been cut in the plexiglass nose of the ship. Before taking off, Kleisch turned and smiled at Miss Roocki. She started to cry a little and said, "Thank God—you got here. I kept telling them the Yanks will rescue us. They were afraid you'd come too late. They suffered so."

Averaging eighty miles an hour air speed, Kleisch made the five-mile flight to Dead Wolf Pond in four minutes. As he landed on the shore of the lake a Coast Guard "Cat" taxied toward him. The stewardess was placed in a yellow rubber boat. Rescue party members wearing "rescue" suits—a neck high garment made of rubberized nylon—waded through the water, guiding the boat and its pain-wracked

(Continued on Page 35)



A survivor has been placed on a rubber raft, to be towed to U. S. Coast Guard PBY and evacuated to Newfoundland's Gander Field, 22 miles away.

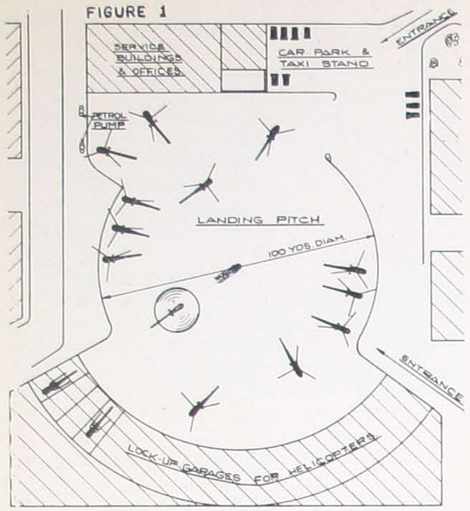
Capt. Samuel Martin, U.S.A.

Lt. Walter Bolton, USCG

Lt. Stewart R. Graham, USCG

Lt. August Kleish, USCG

FIGURE 1



HELICOPTERS as means of TRANSPORTATION

THE FOURTH IN A SERIES OF ARTICLES

by

Raoul Hafner

Chief Designer, Helicopter Dept.
Bristol Aeroplane Ltd.

IN MY three previous articles, General Principles of Rotary Wing Flight, Aerodynamics of the Rotor, and Controls and Types of Rotor Craft, which appeared in AMERICAN HELICOPTER MAGAZINE, I outlined the most important rules and needs for the helicopter of today. In this, my concluding article, I wish to dwell on its possible uses in the times to come. Since I have already given adequate reference to the size of helicopters, I should also like to recall the fact that they are wholly capable of hovering and maneuvering exceedingly well in confined spaces. On the other hand, although they can travel at speeds up to 180 mph, it is most likely that their cruising speed for the present will remain at or near the practical mark of 100 mph. In addition to being able to operate very well either during the day or at night and in any adverse weather condition, they can also, in case of an engine failure, maintain a controlled flight and execute easily a safe landing. For such an emergency landing an area of 100 yards in diameter is ample, the actual landing run being of a length of 10 to 20 yards only.

Having ascertained these facts, we may now consider the many specific uses for the helicopter. For instance, as a weight lifting gear in ports and mines; in all kinds of Civil engineering works where cranes are not practicable; also for police and military uses, and in a seemingly unlimited range of other proposals and ventures of this sort. The main purpose I have in mind, however, is the helicopter as a means of transportation in competition with already existing forms of transport. For this operation we have to consider first a probable ground organization for such helicopter service.

The sketch No. 1 shows a typical helicopter landing and parking place, as I visualise it. There is no reason why such a place should not be situated in a built up area, providing there are no high obstacles in the vicinity, preventing an approach along a flying path of 30 degrees slope.

This provision is necessary to enable emergency landings and take-offs, which are made in such a manner that, at any instance during the maneuver—should an engine failure occur—the pilot is in a position to force land. For this reason take-offs and landings must be made facing into the wind, and the flight path during the take-off into the direction upwards and backwards.

A diametrical strip of the landing area in the direction of the wind should be kept free for take-off and landing, and the remainder of the area used as a parking place for helicopters. Adjoining the landing site we have lock-up garages for helicopters, petrol pumps and service buildings, and the necessary office accommodations, with telephone facilities, and so on.

Preferably, such a helicopter station should be combined with a car service station, and a taxi stand and car park should also be included.

There is nothing elaborate about this layout, and the initial expense and maintenance costs should be very moderate.

I visualize these helicopter stations distributed densely over the country side, as well as in the towns. They are really only a glorified road side car service station, and I feel, therefore, that once the helicopter is available, and subject to suitable guidance from the appropriate authorities, private enterprise will see to it that they grow like mushrooms.

I am afraid I have no space to discuss the efficiency of the helicopter, and therefore, I have to lay aside the basis for its running costs. From investigations which have been made on these lines, however, we know today that it is possible to build helicopters which will be able to operate at a cost of approximately one and a half times that of taxis. This estimate is subject to a fair taxation policy, that is low taxes on aviation fuel, and no direct taxation on the helicopter, at least in the early stages of its development. Therefore, assuming now a helicopter service based on these lines—what would be its chances in competition with other means of transport?

It is necessary here to establish a few definitions which apply to any form of transportation or travel, as per sample sketch No. 2. A journey has a starting point A, and a point of destination D. The distance of transportation d_o is the length of the straight line connecting A and D.

The major part of the journey is performed by the selected form of transport, i.e. by air, road, rail, and so on. It commences at B, the nearest practical point to A for embarkation, and terminates at C, the nearest practical point to D for disembarkatation. The distance between these points, the straight line BC, is defined as d.

This leaves short distances AB and CD at the ends of the journey. Their length varies, of course, with the circumstances, and depends mostly on the form of service employed over BC. They may be nil in the case of a direct "door to door" service. Alternatively they are covered by another, usually inferior, form of service to that selected for the main distance BC.

The difference between AD and BC is:—

$$\Delta d = d_o - d$$

Δ d may be positive or negative, as can be seen by moving the points A and D, and is usually small compared with the total distance. For a larger number of journeys Δd averages zero, which will be appreciated if a large number of points, A1, A_2, A_3, and so on, are assumed in the neighborhood of B, and a similar number of points D_1, D_2, D_3 around C. The mean journey distance for all combinations of A and D is clearly equal to BC, which means

$$\Delta d \rightarrow nil$$

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FIGURE 2

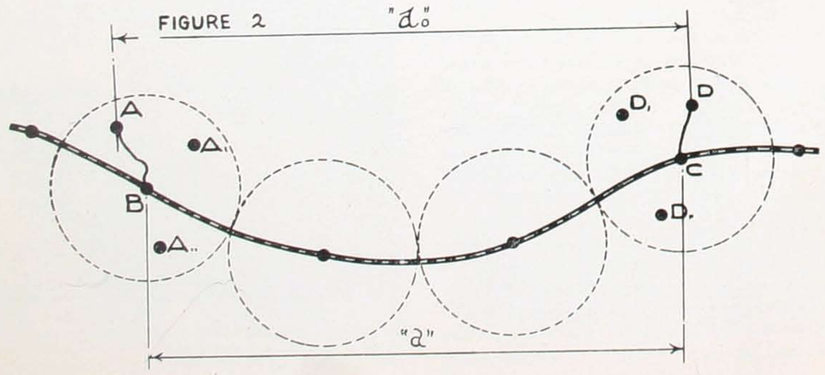
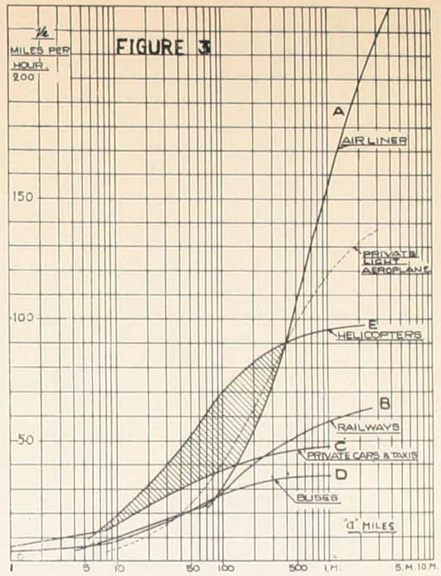
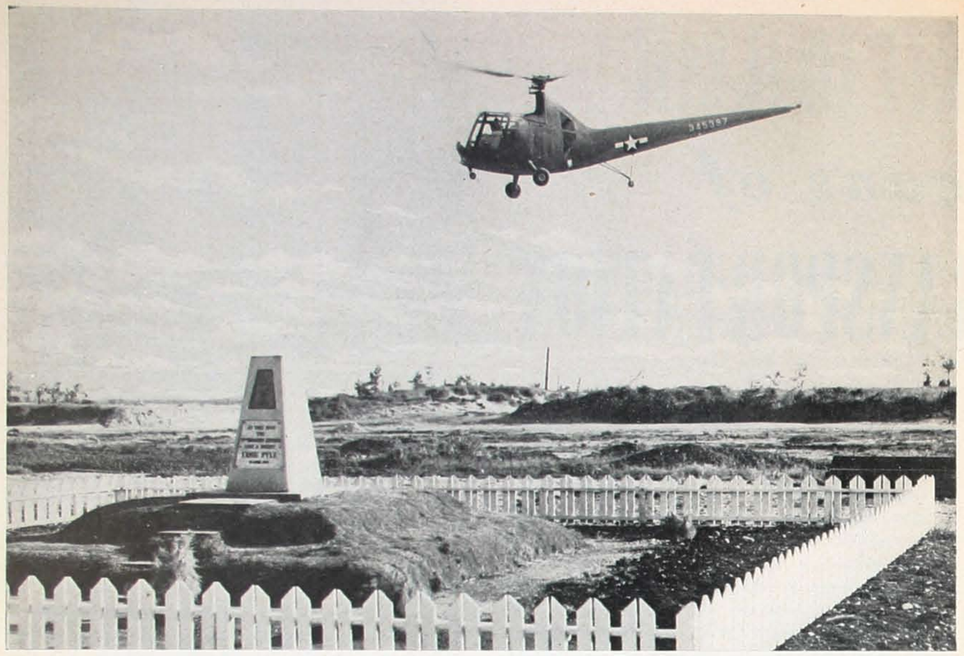


FIGURE 3





The author hovering his helicopter over the Ie Shima grave of Ernie Pyle, the unforgettable soldier's friend.

IT WAS ONE of those stifling hot August days in 1945, with scarcely a breath of air stirring down there in Texas. I had just finished check-riding some helicopter pilot students at Sheppard Field, and wasn't too happy about the ride they had given me.

"Gosh," I said to S/Sgt. Una L. Parker, my WAC secretary, who had been with us from the beginning of our Helicopter Training Program, "I surely would like to get away from all this for awhile and get out into the high, cool-air mountains, with lots of vegetation and nice trout streams."

She smiled understandingly, and was about to say something when the phone rang. "It's for you, Major," she said.

"Hello, Major," said the party on the other end of the line. "This is Major Brown down at Training Command Headquarters at Fort Worth. Just received a wire from AAF Headquarters in Washington. They want to know if you and three of your enlisted men are available to go over into the Pacific for about 90 days on a helicopter mission."

"Sounds good to me, Major Brown," I replied. "I'm quite sure I am available. What will our mission be and when do we leave?"

"It seems," Major Brown went on, "that you will head up a team and help the Far Eastern Air Forces in setting up helicopter operations within their Emergency Rescue Squadrons. This will include assembling R-6 helicopters, training of pilots and mechanics, and setting up of spare parts stock levels, along with demonstrations of latest rescue techniques, plus a selling job to the 'big brass.' You will most likely leave within a week or so."

Towards the latter part of August, after I had almost given up hope of making this junket, the phone rang and I got my final orders. Grinning from ear to ear I announced the good news to Lt. Ben Dardig, our Enginering Officer. The word spread like prairie fire. Soon three smiles even bigger than mine greeted me as Sgts. Kenneth A. Maloney, Harlan W. Pullen, and Cpl. Robert J. Kretvix rushed into my office from the maintenance floor to hear the facts first hand.

"Within a few days we are proceeding to Wright Field," I addressed them. "We spend a week there arranging for spare parts, tech-orders, and rescue gear equipment. Then we go to the Sikorsky Factory at Bridgeport where we pick up the latest maintenance techniques and special tools. From there I am to leave for Washington to get our itinerary for the trip and—I shall meet you all at Hamilton Field in California, three weeks from today."

"You mean we are flying over?" asked Kretvix. "Yes," I said, as we all nodded our approval by smiling.

Thus began our Pacific Helicopter Venture. Hawaii, Johnson Island, Kwjalein, Guam, the Philippines, Okinawa,

Pacific Venture

by

Lt. Col. John J. Sanduski

and Tokyo were points of adventure where destiny had space reserved for us. Instead of the scheduled 90 days, we were to be away for 148. Most of this time we spent in Manila and the surrounding country in setting up pilot and maintenance schools at Nichols and Clark Fields, and in arranging for the procurements of spare parts, rescue operations and demonstrations. With the ending of the war and the rapid demobilization of personnel, our original plan to bring Emergency Rescue personnel from Tokyo, Korea, Okinawa and the Philippines to Manila for a central helicopter school soon petered out.

I shall never forget the day: it was on a Sunday afternoon in September of 1945 that our big C-54E soared off from Hamilton Field, its course set for Hawaii, the first leg of our trip. Some eleven hours later the wheels of our Army transport again touched terra firma at Hawaii's Hickam Field. It was now midnight, Hawaii time, and the warm tropical breeze plus that never ending stream of pineapple juice at the Red-Cross canteen made us feel pretty good inside. Even though this was the first trip west of California for any of us, we all seemed to have quickly adopted that Marco Polo air.

Refreshed by a sound sleep and an enormous breakfast, we set out for the flight lines. Various officers in the Maintenance Depot and Emergency Rescue Squadron were supplied us by Capt. Jackson E. Beighle, a prominent figure in the helicopter field. The depot had already started to assemble two R-6s, so we quickly joined their ranks. In a week we had our first R-6 in the air, and after the first test flight, I proceeded to instruct and fly Lt. Col. Jenks, in charge of the maintenance depot, and Capt. Willis and M/Sgt. Whaley of the 13th Emergency Rescue Squadron.

One day, shortly after the above three were soloed, Lt. Col. Jenks received a disheartening wire. We were ordered to ground all R-6s. Transmission support flanges were reported cracking. After submitting a recommended spare-parts list and breakdown to the depot, we decided to push

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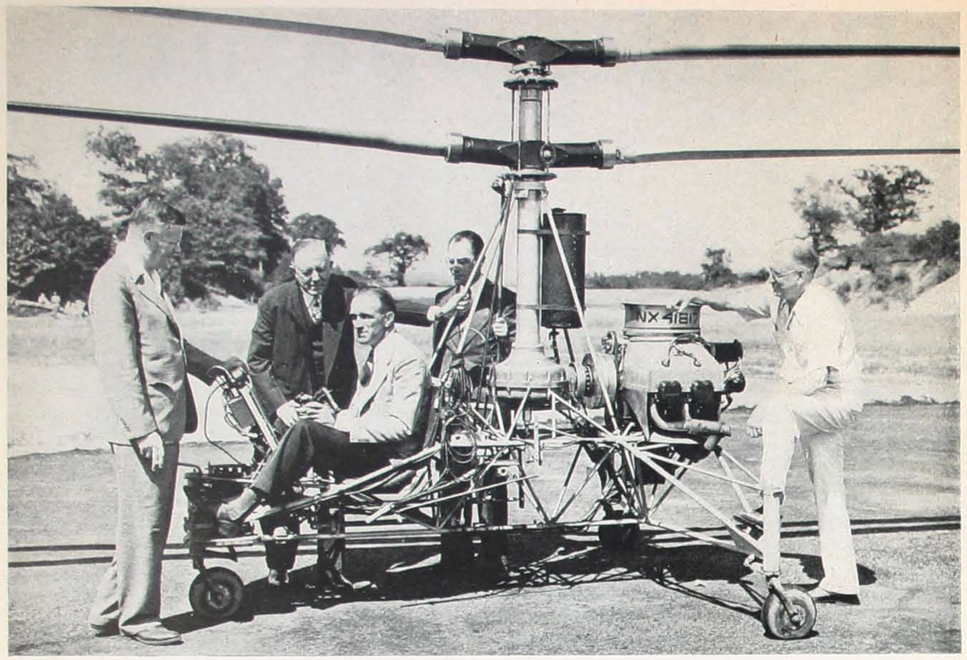
Major Alfred E. Smith, Jr., as Santa Claus on arrival in a helicopter at Malaban distributes Christmas presents to Filipino orphans and adults.



Bendix officials looking over the skeleton chassis of the Model "K" which has made hundreds of test flights. (Left to right): Peter N. Jansen, vice-president in charge of operations; Claire L. Barnes, president; C. L. (Les) Morris, pilot; J. Algot Johnson, executive engineer, and Robert G. Anderson.

BENDIX PROGRESSES

by

George Wales

HM Staff Writer

IN THE YEAR OF 1944 the late Vincent Bendix, whose long list of earlier successful undertakings included Bendix Automobile Brakes, Bendix Home Laundry and Bendix Aviation Corp. organized the Bendix Helicopter, Inc.

Culminating more than a year of intensive research work, design studies, construction and several hundred test flights of its full scale flying model, the company made sound progress. To further its success, it is now completing pilot models of a 4-passenger machine which will go into production early in 1947 at the company's new plant in Stratford, Conn.

The plant is being constructed on a thirty acre tract of land in Stratford and have a one hundred thousand square foot large building. This will incorporate all of the latest improvements in modern industrial design and machinery and on completion it will engage three shifts of workers whose capacity might reach two hundred contra-rotating, four place helicopters per month.

The present test flight Model K helicopter is a wonder. I saw it fly and do all kinds of tricks and even going around and around in such a manner that one might call it the "Waltzing Bendix." Flown extensively to secure data on control, stability, vibration, speed performance, and mechanical integrity since June of 1945, Model K is not a prototype of any Bendix helicopter. It is only, or rather was and remains a machine to be used in service tests of various new aerodynamic principles and mechanical arrangements in advance of the company's forthcoming production models of higher quality.

The Model K has provisions for a pilot only, yet it has made many flights with an overload greatly exceeding its

(Continued on Page 36)

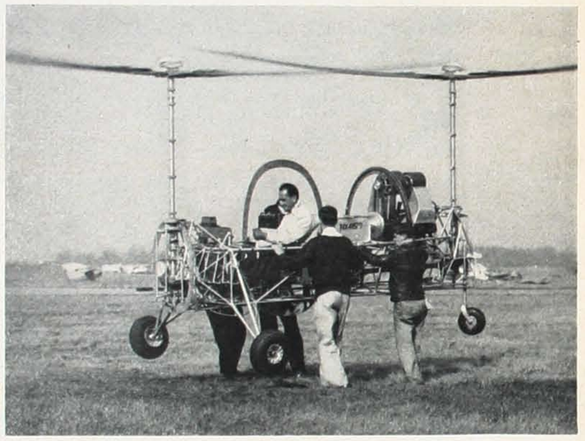
HELICOPTER PANORAMA 1946

Presenting a pictorial review of thirty-one Rotary Wing Aircraft which are now in various stages of development in the United States and Canada.

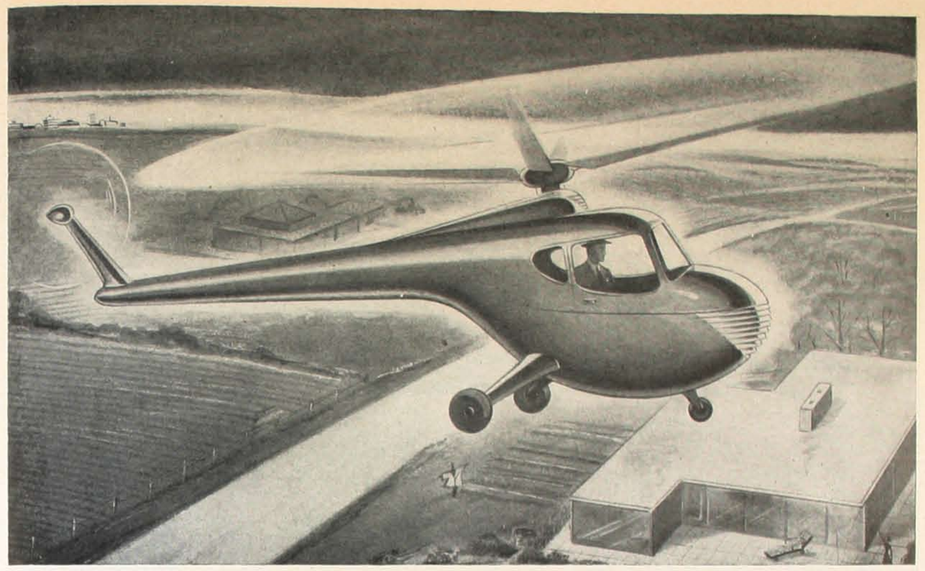
There exist many more helicopters in the blueprint stage, both here and abroad. These will be featured in the future issue as soon as sufficient data becomes available.

BURWELL HELICOPTER—Being developed in Toronto, the machine embodies a new type of control system whose main features are that the collective pitch lever, cyclic pitch stick, and rudder pedals operate a single control unit which is connected to the four rotor blades. No anti-torque rotor is needed, since the blades contra-rotate. A horizontally mounted opposed type engine of 150 hp drives 27 ft. rotor blades.

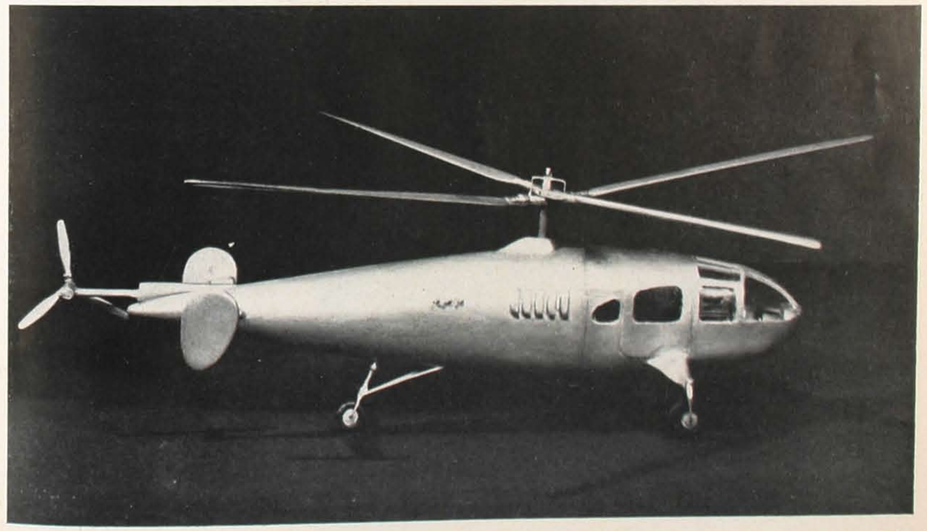
DE LACKNER HELICOPTER—Preliminary tests have been completed to obtain an "NC" license. Powered by a Lycoming 125 hp engine, two fore and aft rotors of contra-rotating, intermeshing type, develop a speed of 100 mph.



DE CHAPPEDELAINE HELICOPTER—Experimental model, a flow control rotor will be installed in which the boundary layer section of the sirstream will be controlled to provide more efficient lift. Due to this and free floating rotor mounting, the control stick will lock in any position, enabling the craft to fly "hands off."



DOMAN-FRASIER—The LZ-1, or "Little Zipper," is a two-place helicopter designed for research activities. The rotor will be further forward in the finished craft so that variable loads are directly beneath it and the center of gravity will not be affected by load changes.

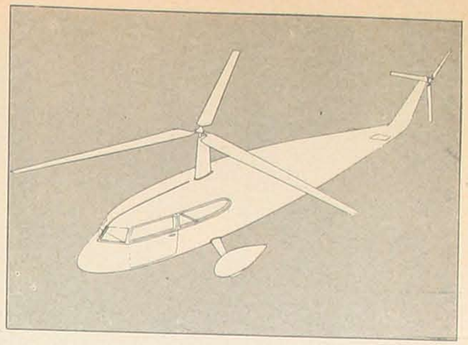


ENGINEERING PRODUCTS OF CANADA—The first Canadian helicopter, a three-place SG model VI, is powered by a Franklin, 6 cylinder, 178 hp motor at 3150 rpm. Gross weight 2218 lbs., weight empty 1550 lbs. It incorporates a four-bladed rotor with flapping and lag hinges and a four-bladed, semi-rigid see-sawing counter-torque rotor. Maximum speed 105 mph, cruising speed 80 mph, and cruising radius 160 miles.

FIRESTONE HELICOPTER—The new two-place Model "45," powered by a small 125 hp four cylinder engine, incorporates a three-bladed main rotor and anti-torque tail rotor. Overall height is 8 ft. 1 in., length 25 ft. 5 in. It is equipped with dual controls, side-by-side seating arrangement in a lucite-enclosed cabin giving a 270 degree range of vision. Weighing less than a low-priced car, it can be flown hands-off controls.

GAZDA HELICOSPEEDER—Of unorthodox design, this is the first helicopter to employ jet propulsion and jet steering. While it takes off vertically, hovers, flies backward, and lands vertically by means of its main rotor, the most significant feature is that in jet-propelled forward flight it flies like a fixed wing jet propelled airplane. However, the conventional wing is replaced by the spinning rotor.

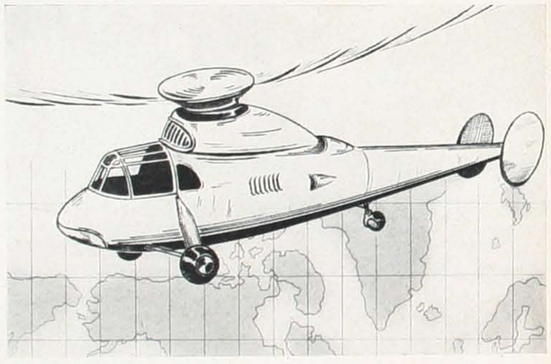
HAIG HELICOPTER—Being developed in California, it will carry four persons at a speed of 115 miles ph, and has a cruising range of 300 miles, with a landing speed of "0" miles ph. Gross weight about 2,000 lbs.



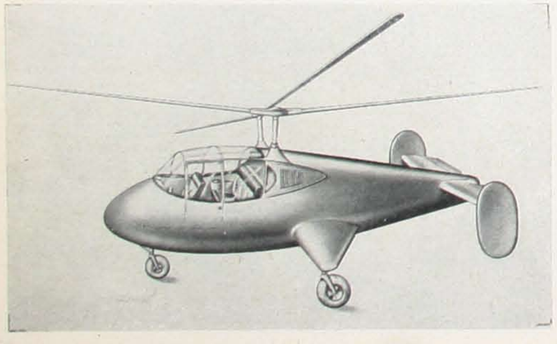
PLATT-LePAGE HELICOPTER—"XR-1A" by Platt-LePage Aircraft Company. This is a military version powered with a 450 hp Pratt-Whitney engine. It has a tandem seating arrangement for pilot and observer. No production of commercial machines is contemplated at this time.

HIGGINS HELICOPTER—Designed by Enea Bossi in 1943, the EB-1 was flown quite successfully for a great many hours. Powered by a Warner 190 hp motor, the four bladed two seater weighed 2550 loaded, and 1950 empty. It was built by Higgins Industries, Inc., under Bossi license, to evaluate certain design theories, and was finally "retired" not long ago.

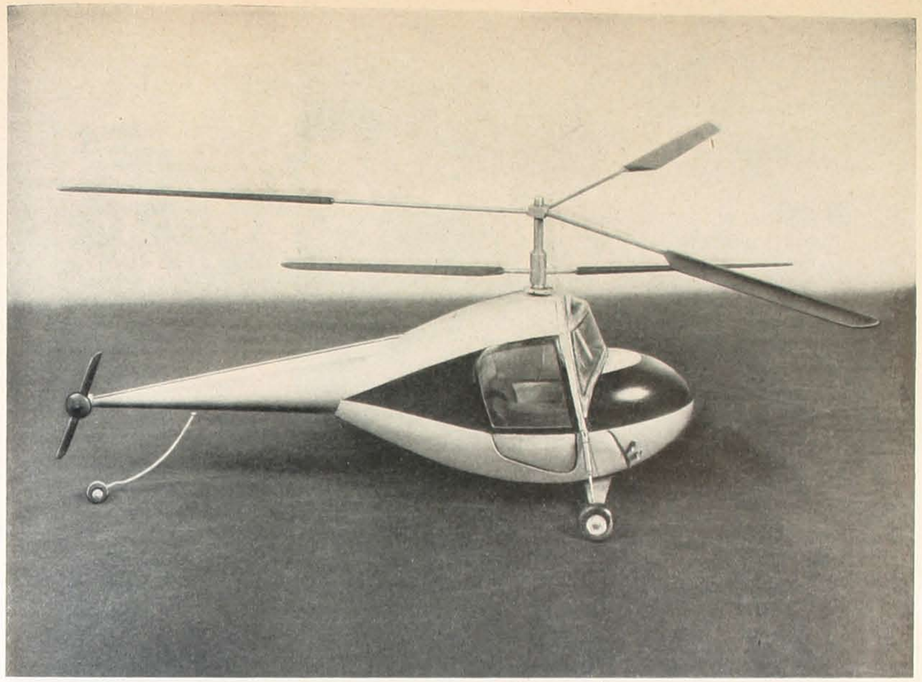
HOPPI-COPTER—This unorthodox, highly interesting helicopter has aroused a great deal of interest both here and abroad. The inventor Mr. Pentecost has flown the machine several times under tethered conditions, where it performed very encouragingly. There are no flight statistics but the development is proceeding.



JET HELICOPTER—A two-place, experimental model now under construction, the BC-36X incorporates a jet driven rotor. A simplified control system is designed to reduce vibration. As no tail rotor is required, residual torque forces are balanced by turn rudders, so located as to increase directional control and stability.

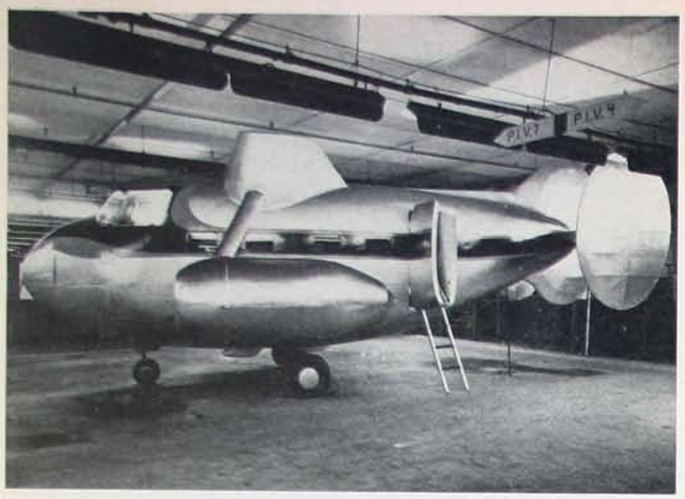


KAMAN HELICOPTER—"K-125A," illustrated here, will carry three people including pilot. Powered by a 125 hp engine, a simplified rotor system is part of the inherent design and this factor is expected to greatly reduce cost of production. No additional details have been released.



JOVANOVICH HELICOPTER—This two-place model "JOV-1" incorporates one thin-blade and one smaller two-bladed coaxial two-stage rotor system with tail rotor. Its specifications include: gross weight 1340 lbs.; weight empty 860 lbs.; useful load 479 lbs.; main rotor diameter 26 ft.; top speed 100 mph; range 100 miles. It is powered by a modified Lycoming engine.

KELLETT AIRCRAFT—"XR-8" now undergoing flight tests, is powered by a 6 cylinder Franklin engine and incorporates the principle of intermeshing rotor blades.



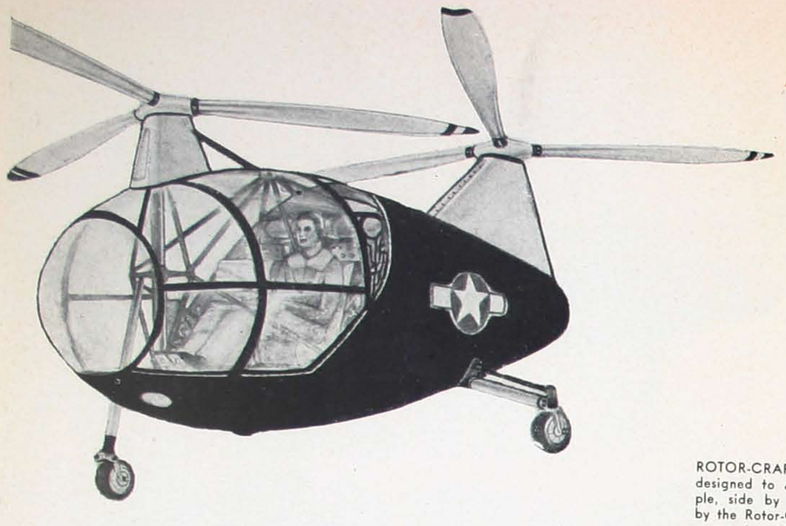
KELLETT AIRCRAFT — "KH-2," a large transport version of the proven inter-meshing configuration, with an engine in each compartment. The mock-up pictured here was under experiment for many months in an effort to develop an efficient cargo helicopter.

LANDGRAF HELICOPTER—A single-seater, powered by an 85 hp Pobjoy engine, speeds near 100 mph. Note retractable tricycle landing gear. Developments on additional models are in progress.

McDONNELL AIRCRAFT—Navy model "UHJD-1," a twin-engine, twin-rotor helicopter developed for the Navy by McDonnell Aircraft Corporation. Gross weight of this machine is over 11,000 lbs.

PIASECKI HELICOPTER—The "PV-3" manufactured by Piasecki Helicopter Corporation, is designed to carry 14 passengers in commercial operation. This is a development of the one-place "PV-2" still in operation after three years of intensive testing and demonstration.

HELICOPTER CORPORATION OF AMERICA—The de Bothezat experimental model helicopter is of the coaxial type. It is equipped with a de Bothezat inter-airscrews helicopter engine of 75 hp, boosted to 80 hp. Airscrew diam. is 28'. Actual lift achieved in tests was over 20 lbs. per hp.



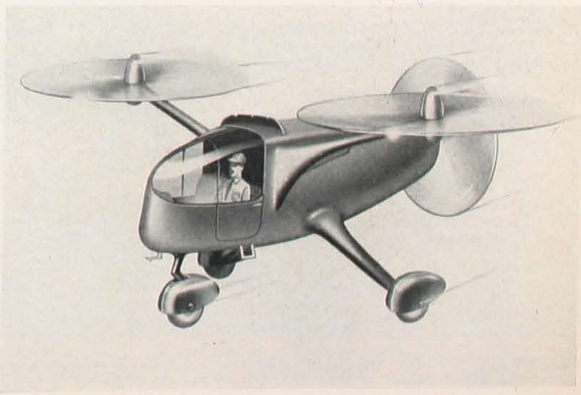
ROTOR-CRAFT—"X-2 Dragon Fly," designed to accommodate two people, side by side, being developed by the Rotor-Craft Company, will incorporate a 100 hp engine and a tandem arrangement of rotors. The Rotorbus is also a design of Rotor-Craft.

ROTAWINGS, Inc.—"Rota Airbus RA-2," will carry 7 passengers in addition to pilot. Speed is estimated at 115 to 120 mph with a cruising speed of 100 mph. Vertical climb rate is 450 fpm with a 10,000 ft. service ceiling. The "RA-2" will be powered by two Jacobs engines of 300 hp.

ROTERON—Roteron "X-100" is a small, safe, easily controlled and inexpensively operated helicopter. It incorporates coaxial rotors which go into autorotation if power fails. The price range will be about $2,800 in limited production, but will be less for mass production. Further specifications have not been released as yet.

SAFTI-COPTER — This helicopter was designed to incorporate and simplify construction with many safety factors. Its size and shape are similar to the average automobile to utilize a minimum of storage space. Powered by a 40 hp Continental engine, the Safti-Copter will be economical to operate.

SCHOUW HELICOPTER Extensive testing has been done on the design principles of the Schouw helicopter "H-100," illustrated here. Statistical information has not yet been released. Particularly noteworthy is the pusher type blade mounted aft. This blade is designed to give forward, or backward propulsion and can be neutralized for hovering.



UNITED HELICOPTERS, Inc.—The new Hiller two-place Commuter model incorporates a two-bladed coaxial counter-rotating rotor system. It is powered by a 4 cylinder, 150 hp air-cooled engine. Rotors are provided with a chordwise flapping on see-saw hinge, classing it in the semi-rigid type. Blades can be lined up fore and aft for parking. The preliminary characteristics are as follows: gross weight 1600 lbs.; useful load 520 lbs.; maximum speed 100 mph., range 300 miles.

SIKORSKY AIRCRAFT—"S-51," Sikorsky helicopter shown here carries 3 passengers plus pilot. Powered by a Pratt-Whitney Wasp Junior R-985 engine, it has a maximum speed of slightly over 100 mph and will cruise at 80 mph. The S-51 succeeds the R-4B, R-5, and R-6 helicopters.

IT'S IN THE HAT

by

Norman Edgar

Helicopter Air Transport, Inc.

IN THE PAST it was difficult to find new avenues for pioneering. But the years have wrought a change. Nowadays this pioneering is different. It has been made comparatively easy despite the fact that its spirit sometimes encounters a great deal of lost time, effort, and money. This is so well known to those of us who have been associated with air transport since its early days and we cannot fail to remember that inevitable headache—"What happens if the motor stops?" Only the passing of the years has forced this query into the background, for the public has learned to accept the rapid advance of aviation science. Now, once again, the helicopter has raised this inevitable question. For reincarnating this once dead remark we can promptly blame the helicopter inventors. But instead of a helpless shudder and groan, the modern pioneer can triumphantly answer, "Let it stop, it makes no difference."

When the wave of helicopter hysteria began to sweep the country as a result of rotary wing achievements, the CAB was flooded with requests for routes. Wise in their generation, it calmly took a back seat, and waited with the secret thought, "Perhaps out of this welter something might emerge which would afford a real contribution to a possibly new phase of transport—a phase which apparently the public wanted, but yet a phase for which engineering development needed further time for experimentation and adaptation."

In the meantime valuable experience was gained in the hard way above the Atlantic an dthe rough and tumble of the Pacific, in the humidity and rains of Burma, and the snows of Labrador; for there flying time was far more conducive to improvement in design and maintenance features than here in routine experimental flights around the field.

Through all this mighty testing, the commercial future was coming nearer, but not as close as all the would-be pioneers expected. For the responsible air transport personnel were reserved in their thinking—the helicopter was a box of tricks, likely to be uneconomic, and unreliable. These calculating critics omitted to recollect, or perhaps their experience was too short to enable them to recollect, that in the early days of air transport, the airplane was certainly not an economical venture—and definitely not a reliable means of transportation. One recalls that after many years of operation with conventional aircraft, one of the foremost air transport companies in the world was advised to adopt the slogan, "If you have time to spare, travel by air, but if time is your aim, travel by train."

(Continued on Page 43)

ON THE TECHNICAL SIDE

Reviewed by the members of American Helicopter's Technical Board

"NEWTON AND FLUID MECHANICS." Remarks by Dr. J. C. Hunsaker, Chairman NACA at Newton Tercentenary Celebration, England. 15 pp.

In this paper Dr. Hunsaker outlines briefly the contribution of scientists of many countries, beginning with Newton 300 years ago. The evolution of the well known N.A.C.A. laminar flow airfoil, or low drag wing, derived from theory, and applied during the late war to both fighter and bomber airplanes, was disclosed. This is the first revelation of the low drag airfoil principle which was applied so successfully and which represented one of this country's top secrets during the war. The author considers that Newton's conception of dynamics provided his successors with basic tools which were necessary for the development of modern engineering science. He considers modern areodynamics as completely Newtonian in its development as the scientists not only use Newton's laws of motion, but to this day utilize some of his original tactics to obtain solutions. Some interesting details of recent developments in engineering practice, are also revealed, and new problems, in uses when speed of flight equals the speed of sound, are discussed.

HELICOPTER PERFORMANCE by R. L. Lichten, Journal Aeronautical Science, vol. 13, No. 7, July 1946, pp. 353-363.

The author presents a short and concise method of calculating helicopter performance which retains the accuracy of the blade-element approach.

Equations and evaluated coefficients are developed for the flapping, thrust, longitudinal force, and power of a hinged-blade lifting rotor. They include the effect of linearly tapered and twisted blades. These equations are expressed as simple functions of the inflow ratio and the blade pitch angle. Tables of the necessary coefficients are given.

The following general references on aeronautics are now available from the Superintendent of Documents, Washington 25, D. C.

AIRCRAFT FUEL SYSTEMS, U. S. Bureau of Naval Personnel, Navy training course, NAUPERS 10355, 336 pp. 60c.

The introduction of this book is devoted to a brief explanation of the functions of the fuel system. Following the introduction general information is presented on tanks and tubing, fuel lines accessories, and fuel pumps. Then an explanation is given of the principles of carburetion, the kinds and uses of gasoline. It also describes the Stromberg float-type carburetor, the Stromberg injection carburetor, and the Holley carburetor. In conclusion, there is a section on the induction system, which includes discussion of the intake manifolds and superchargers.

AIRCRAFT PROPELLERS, U. S. Bureau of Naval Personnel, Navy training course, NAUPRES 10336, 238 pp. 40c.

After a section on the basic principles of propeller operation, this book discusses the four types of propellers used today in naval aviation. There is general information on the two-position controllable pitch propeller, the constant speed propeller, the hydromatic quick feathering propeller, and the electric propeller.

Two papers are now available on Japanese balloons.

JAPANESE BARRAGE BALLOON EQUIPMENT by G. E. Weidner, Army Forces in the Pacific Engineer Technical and Technological Survey, January 5, 1946, Dept. of Commerce Pub. PB 27687, 62 pp.

The purpose of this investigation was to obtain factual data covering research development, fabrication, production, and operation of barrage balloon equipment. Included in the investigation, in addition to the balloon winches, were inflation and mooring equipment, lethal devices and methods of operation.

The report shows that the advancement made by the Japanese in the development of barrage balloon equipment

(Continued on Page 42)

BOOKS

"PRINCIPLES OF PHYSICS I," Mechanics—Heat—Sound, by Francis Weston Sears, Addison-Wesley Press, Inc., Cambridge, Mass. 526 pp. $6.00

The title of this book has been chosen deliberately to indicate that it emphasizes the physical principles. The historical background and practical applications have been given a place of secondary importance.

In the beginning there are several chapters on statistics in order that kinematics be postponed until the student becomes familiar with the concepts and notation of calculus.

Many of the problems in the book are taken from examinations given with the physics course at M. I. T. and three systems of units are used; the English gravitational (used in engineering work), the cgs system because some familiarity with it is essential for any intelligent reading of physics, and the mks system because of its increasing use in electricity and magnetism as well as because it may eventually supplant the cgs system.

Multiflash photographs accompany the text which has been developed out of the author's experience in teaching physics at the Massachusetts Institute of Technology.

"YOUNG AMERICA'S AVIATION ANNUAL," by David C. Cooke. 224 pp. $3.00

Here is the story of the Air Technical Command at Wright Field, Ohio, where the cradle of American airpower rocked during the war. Thousands of experts of the ATSC worked twenty-four hours a day perfecting our fighting planes in the desperate race to keep ahead of the enemy in aircraft development. The exciting history of this Command is now told completely for the first time.

Jet-propulsion aircraft was first developed by the Axis, quickly followed by England, then finally by the United States. The Lockheed P-80 Shooting Star is generally considered the greatest jet fighter yet constructed and it has put us many strides ahead of any other nation.

The author has created an exciting text and makes this book "so realistic that one feels he is there himself." The book is designed for the aviation reader too young to be interested in technicalities, but old enough to understand scientific details presented in a readable and interesting style.

"STATICALLY INDETERMINATE STRUCTURES," by L. C. Maugh, Associate Professor of Civil Engineering, University of Michigan. John Wiley and Sons, Inc., New York. 1946. 338 pp. $5.00

The book contains material used as a course in the analysis of statically indeterminate structures for senior and graduate students at the University of Michigan. It also covers the fundamental principles of structural mechanics, starting from Hooke's law and finishing with Williot's diagram. Particular emphasis is given to numerical solutions by various methods of successive approximations, such as moment distribution, iteration, trigonometric series, and the panels method. These methods, not requiring solution of many simultaneous equations, are the most notable advancement in structural design in the past two decades.

Special problems in statically indeterminate stresses, frames with semi-rigid connections, space frames, including engine mount frames and shearing stresses in thin-walled closed section, including stresses in multiple-cell wing sections, are presented in the last chapter. Numerous charts, sketches and diagrams illustrate the book.

"WORLD WIDE PLANISPHERE," by William H. Barton, Jr. Addison-Wesley Press, Inc., Cambridge, Mass. $3.50.

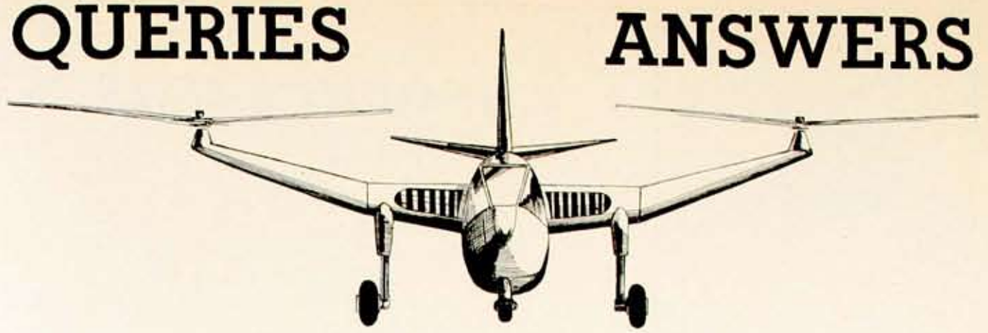
"Celestial navigation is the art of conducting a vessel or a plane over the earth's surface, using the heavenly bodies as guide posts." Frequently, a navigator is limited in his mastery of the subject of celestial navigation. Mr. Barton has written a companion piece to his earlier, "An Introduction to Celestial Navigation," but one that may be used equally well with other navigation texts.

Both the student and the more experienced have trouble interpreting two-dimensional diagrams on a book page, as three dimensional objects. A command of three dimensions is necessary and the success of navigation teaching in the Hayden Planetarium is believed to have been due to the fact that it is three dimensional. The use of stero pictures (three dimensional) is applied in this text and the printer has successfully carried out his difficult task.

Mr. Barton is not endeavoring to make a complete explanation of the principles of either astronomy or navigation. Rather he is making it possible for the reader to picture the complexities of three dimensional space so that he may gain a clearer conception of the principles and definitions of celestial navigation.

The book consists of a combination planisphere in the form of four disc charts. Two star discs are used for orientation and navigation purposes. One of the charts is for the Northern Hemisphere, the other for the Southern Hemisphere. The two other discs are provided for the amateur astronomer learning the constellations. Standard diagrams supplement many of the explanations. This text book is a zodiac itself against which the modern navigator can move his knowledge.

QUERIES ANSWERS



Is the Hamilton Standard's "new propeller with efficient square-tip blades" the latest achievement in propeller design?

It may be considered as "a contribution to smoother and safer flight," to a certain extent. Some details about it will be published in the pages of this magazine in the near future, in a special article. But the first design of this type of lifting propeller may be traced back to 1928, when Dr. George de Bothezat successfully demonstrated its specific advantages.

Is the so called "figure of merit" a correct criterion for comparison of helicopters?

This question cannot be answered briefly. The reader will find a thorough and simple scientific analysis of this important question, to which a special article must be devoted in one of the early forthcoming issues of this magazine.

Which is less comfortable, a train, or plane trip?

Survey of an independent research agency answers this question: 51% of the travelers found trains less comfortable, 20% the plane less comfortable, and 10½% about the same, and 18½%—"don't know!" (Boeing Magazine, June 1946.)

Why are helicopter rotors built so thin? If you desired only lift, and not maneuverability, would a rotor wing be designed any different than the rotors used on helicopters today?

The thickness of a helicopter's rotor blade is a property of an airfoil chosen mainly for obtaining the maximum possible lift at the minimum possible drag at a selected angle of attack.

Using a special airfoil independently of its thickness, the design of a rotor blade for lift alone is different from its design for higher forward speed of the helicopter. This is due to the fact that in both cases the conditions of the rotor blades' operations are mutually contradictory. For the lift alone, slow rotating (slow tip-speed) blades are more advantageous than the fast rotating blades, while for horizontal flight, the condition is reversed because the range of the stalling angle of attack of the retreating blade must be increased with the advance in forward speed. The above-mentioned conditions are also responsible for the shape *of a blade at a* given *blade thickness.*

What are the most common uses of helicopters? I know they have a lot of possibilities, but what I want to know is what are they really used for?

The most common uses thus far have been in Coast Guard and Army rescue work. They have been used for geological survey work, crop dusting, flying the mail, forest ranging, short-haul loads and pest control. These are all actual uses to which the helicopter has been put. The possibilities lies mostly in the range of cab service, inter-urban passenger service and private flying.

What did the helicopter do during the war and how successful was it?

Your query came in before the October issue of the magazine. You will find an excellent answer to this question by reading Major Knute Flint's article entitled "Rotating Across the Good Earth" on page 8 of the October issue. Here is the story of the earliest uses of helicopters in the war-torn Orient, how the first two groups made out, what were their great uses and great weaknesses and, finally, how the 'copters flew the peaks and valleys of the Hump, making many rescues and establishing itself as a machine that may become, in the words of Major Flint, "the prime instrument for all types of rescue."

ST. MARTIN IN THE WOODS

(Continued from Page 9)

cargo to the Catalina waiting fifty feet off the shore.

An official observer of the rescue work, both at Dead Wolf Pond and the plateau, spoke of the peculiar psychological barrier toward flying which the crash had created in the minds of some of the survivors.

One survivor in particular, Jean Perier, daughter of Gilbert Perier, director general of the Sabena Airline—operators of the ill-fated airliner—became hysterical as she was placed aboard the Catalina. Obviously, those horrible moments that followed the crash had been burned into her brain. She feared a repetition of the night-marish scene. Remarkably, though, she displayed no such fear when the helicopter slowly and gently ascended from the plateau. Rather, she seemed unaware that the ship was in the air for the first few minutes of the flight.

As the "Cat" came to a stop, bearing the final two survivors brought in during the first day of rescue operations, the seriousness of these victims' injuries and the importance the time factor played in the recue work, was emphasized. Grim faced Lieut. Comdr. James Schrader, USCG, leaned out of the cockpit and shouted to hospital members waiting on the ground to transfer the injured from the ship to an ambulance. "Don't touch them. Martin said 'no one was to touch them until one of your doctors saw 'em.' Here's a note he gave me."

A doctor from the hospital, a few hundred yards from the parked ship, ran up to the scene. Schrader handed him Capt. Martin's note. Darkness had closed in by then and the Northern Lights were beginning their ghostly spectacle. He read the note in the beam of an auto headlight. "These people are gravely injured," it read, "advise utmost caution in moving them."

Lt. Bolton has just landed his helicopter at Wolfe Lake after evacuating a seriously injured woman from scene of disaster.

The survivors were John King, son of the Chinese Ambassador to Belgium, and Leona Tonglet, of Brussels. The doctor hoisted himself through the gun blister of the ship and disappeared from sight. A few minutes later he reappeared and told the litter-carriers, "okay—take them in."

King had received severe gashes when the ship crashed. His body and arms were heavily bandaged. Though handling of the survivors had been reduced to a minimum his wounds had opened and he was bleeding through the bandages as he was placed in the ambulance.

Several people gasped as the litter containing Mrs. Tonglet slid into sight from the "blister." In the faint light from automobile headlights trained on the ship everyone saw the peculiar position of her head. It was twisted cruelly to one side, like the head of a toy doll that had suffered at the hands of a careless child.

Someone whispered, "Christ—her neck must be broken."

I remembered the words of Lt. Christian over the walkie-talkie, shortly after he and his comrades had reached the marooned survivors: "They're hurt bad—very bad."

Later in the evening I talked to Lt. Kleisch, in his room at Army Headquarters. He had just finished shaving. He handed me a cigar and a drink of Scotch.

I asked him what he thought of the rescue work.

"How do you mean," he asked, "from an operational viewpoint, or from the angle of the injured?"

"I'd like to know how you feel about it from both angles."

"Well," he thought for a moment. "I've had tougher operations. For example the time we brought nine RAF fliers out of Labrador. They had been trapped in the mountains for 13 days in snow. It was no place for either a man or a brass monkey."

"We had a helluva' time getting them out," he continued. "Everything was against us. The cold, the snow, the terrain, the damned winds. But they were men. Seeing the women on the plateau this afternoon, busted up and burned and in pain, made me feel glad that I was in on this job. I wanted to do everything, everything humanly possible for them. The guys who deserve the credit here are the kids who went in with the rescue party. I mean, the Coast Guard men who trimmed the tree tops to drop food and medicine and sleeping bags onto the scene. The people who set-it-up for us. I'll never forget how the victims thanked us at the plateau. I have a wife and kid. I don't know why, exactly, but I thought of them a lot today."

The second day of the helicopter operation broke clear and full of sunlight. Kleisch, followed by Lt. Bolton in the R-4, took off for the plateau shortly after dawn.

(Next Page)

The use of the additional helicopter made fast work of bringing in the remaining ten survivors. Hardly had a "Cat" landed with survivors at the airport than the next ship was drumming across the horizon.

The first survivor to leave the plateau during the second day's operation was Selma Kronengold. She arrived at the base hospital at 7:30 AM. The tenth, and final survivor, was removed from the plane one hour and twenty-five minutes later. He was Charles Kronengold, husband of Selma.

The 3,000-odd inhabitants of Gander Airport, including various airline officials, American and Newfoundland government representatives, were unanimous in their praise of the ingenious helicopter operation. Doctors admitted candidly that the speed and efficiency of the rescue saved many lives. And thus, the acquisition of this versatile machine to augment equipment in this important trans-atlantic airliner junction, appeared to be a foregone conclusion.

And the wilderness itself, studded and scarred with a score of wartime plane-wrecks before, has added to its tragic history a marked spot of twenty-six white crosses. Those who were fortunate in having been saved, named this memorable site, "St. Martin in the Woods," in expression of their deep gratitude to Capt. Martin, and to all military, naval, and civilian persons for their heroic rescue work.

BENDIX PROGRESSES

(Continued from Page 34)

intended capacity. It is a "contra-rotating, co-axial" type of helicopter, which has two main rotors, mounted one above the other or two concentric shafts, and which are geared to turn in opposite directions. This arrangement does away with the need for a long tail and the tail-rotor, usually associated with single rotored helicopters.

This is quite an advantage, because it is a well known fact that a tail-rotor detracts from the overall efficiency of a helicopter, because it absorbs a considerable amount of horsepower. In the Model K there is no horsepower waste since all power is directed into useful lift propulsion. Other features of this configuration are those of more compactness, with a minimum of space required for landing and take-off, thus adding greatly to its practicability. A 100 hp Continental aircraft engine drives the rotors, which have a radius of 12 ft. 6 in. The machine itself has a gross weight of 1200 lbs., including pilot and fuel.

A free wheeling unit is also incorporated in this model, in the event the engine should fail. This ensures the rotation of the blades so that a gliding descent and safe landing can be executed under the full control of the pilot.

The first Bendix Helicopters will be relatively expensive and, therefore, initial sales will be largely confined to commercial and government organiations. Lower-priced Bendix helicopters will become available to the general public at a later date.

The new plant and property are under long-term lease from Stratford Estates, Inc. The building and site improvements were designed by the office of Irwin S. Chanin, architects specializing in modern industrial design. Construction is being carried out by the Dyker Building Co., Inc., industrial engineering division of the same organization.

The main building will be 525 ft. by 173 ft. and will consist of a two-story section and one-story plant proper. The factory will have its own siding to the main tracks of the New York, New Haven, and Hartford Railroad, in addition to riparian rights on the navigable tidewaters of the Housatonic River. Receiving and shipping will be further facilitated by the plant's location near U. S. Route L, a 4-lane motor highway.

Already completed is one new building now being used for the construction of experimental models for test purposes, demonstration and planning. A three-story building which previously existed on the site, has been converted into headquarters, where the operational and technical staffs of the corporation are now carrying on their work. At present there are 85 persons employed in the Connecticut establishment of whom more than 25% are veterans of World War II.

At this time there is in progress the construction of six 4-place experimental Model J helicopters. This model, also of the co-axial type, has a 450 hp Pratt & Whitney engine, driving two, twin-bladed 48-foot counter rotating rotors, mounted one above the other. In line with the company's policy, the manufacture of parts for the Model J, is now under way at many other plants in the Connecticut area. In order to keep its own facilities available for assembly and testing, as many of the component parts of the helicopters as possible will be sub-contracted.

Administrative personnel at the Connecticut plant includes: Peter N. Jansen, Director and Vice President in charge of operations; Charles L. (les) Morris, Asistant to the President, Chief Test Pilot and Supervisor; Martin Jensen, Vice President and Chief Design Engineer; J. Algot Johnson, Executive Engineer of the Corporation; Robert G. Anderson, Factory Manager and Dr. Alexander Klemin, consultant of the company.

The executive offices are at 50 Rockefeller Plaza, New York City. The executive committee, which maintains active contact with the affairs of the company, includes Mr. Jansen and Mr. Frederick K. Barbour, Chairman of the Board; Robert J. Newhouse, Treasurer and Chairman of the Executive Committee; Charles L. MacDonald, Secretary and Director. Other Directors of Bendix are: William A. Smart, Paul V. Gontard, and Lloyd Maxwell.

HELICOPTERS AS A MEANS OF TRANSPORTATION

(Continued from Page 11)

The time needed to travel from A to D is t_o, and the time for the journey from B to C is t, the difference is defined as

$$\Delta t = t_o - t$$

Now Δt varies with circumstances, depending on the length of the subsidiary journeys AB and CD, on the time for embarkation and disembarkation, and other factors.

It is clear, however, that for a large number of journeys, the average Δt does not approach zero, but has a definite value. This value can be shown to be constant for a given form of service, and is practically independent of the length d of journey. It is therefore, suitably termed "marginal time loss."

Now the rate of progress along BC, or the mean cruising speed along this line is defined as:—

$$V_m = \frac{d}{t}$$

In a similar manner the mean effective speed of the whole journey from A to D is

$$V_e = \frac{d_o}{t_o} = \frac{d + \Delta d}{t + \Delta t}$$

however, because Δd averages zero

we can write $$V_e = \frac{d}{t + \Delta t}$$

which, with substitutions, gives the following expression

$$V_e = \frac{V_m}{t + \Delta t\,(V_m / d)}$$

We see, therefore, that the mean effective speed depends on the mean cruising speed, the length of the journey, and the marginal time loss.

The mean cruising speed, in turn, depends on a number of factors.

(1) The maximum cruising speed obtainable with the type of transport employed.
(2) The ratio between the lengths of the straight line BC and that of the actual path of travel.
(3) The number of intermediate stops, or points, which for reasons of safety or otherwise, must be passed at a speed which is less than the maximum cruising speed.
(4) Weather conditions, etc.

The marginal time loss depends mostly on the density of the points of embarkation or disembarkation, which determines the length of subsidiary journeys. Further, the speed of transportation on subsidiary journeys, the time lost in changing vehicles at B and C, and finally, the average time lost waiting for connections. On this basis let us now consider air transport by air-liner.

I assume, in a future service, an economical cruising speed of the order of 300 miles per hour.

In a country like England, there will be airports at average distances of 65 miles. They cannot, of course, owing to their size and the nature of the air service, be in towns or centers of activity, which results in an average of 39 miles, for both subsidiary journeys to and from the airport.

These figures substituted in the formula for mean effective speed give now the very interesting curve A. The remarkable fact arising from this curve, is a pronounced decrease of mean effective speed of transportation with the length d of the journey.

We see here, that even under conditions of an efficient air service, which, it is hoped, will be attained at some future date, the mean effective speed of a journey of, for instance, 100 miles, would only be of the order of 30 mph. It is obvious, therefore, that the airliner is quite unsuited for short journeys.

Let us now see how rail transport compares. The railway companies have lately issued a statement, which, among other points of information, hints at possible future speeds on railways. I have taken some of their figures. Usually, for short distances below 60 miles, the journey is made by a local train, and for distances of more than 60 miles, by express trains, with the use of local trains at the end of the journey.

I have assumed a mean cruising speed for express trains of 65 mph. To attain this the train would have to run at a speed of over 80 mph, for a good deal of the journey. And owing to the great density of railway stations, and the fact that they are suitably placed with regard to centers of activity, the average marginal time loss for rail travel is better than for air travel. It works out at approximately 40 minutes, and thus, these figures give the curve B for the mean effective speed of rail transport.

As regards motor road transport, we face the following facts: the private car and the taxi represent a "door to door" service. There is, therefore, no marginal time loss in this case. In regard to the bus services, and under the category I would put the special railway services which are provided in densely built up areas, such as the underground and suburban lines, there is only a very small marginal loss, of the order of 20 minutes. On the other hand, however, the mean cruising speeds for these forms of transportation are low, due to the frequent stops or delays, which are necessary in the interests of safety.

(Continued on Page 47)

PHOTO CREDITS

McDonnell Aircraft Corp. 5
U. S. Coast Guard 8, 9, 35
Bendix Helicopter, Inc. 14

PACIFIC VENTURE

(Continued from Page 13)

on to Guam as there was nothing further we could do to be of help.

Before leaving we flew over to Molokai. Lt. Col. Jenks asked me to accompany him to this nearby island to investigate the top of one of its mountains for a possible helicopter landing site for explorers. Apparently this area had never been visited by man. Col. Jenks, Kretvix, Maloney, Pullen and I strained our eyes peering out of our C-47 as we banked around the mountain seeking a clearing for a helicopter landing. Nothing but jagged rocks, knotted trees, and brush greeted our view. Had we been less intent on trying to find a helicopter landing spot, we could have been enthralled by the majestic beauty and splendor of this gorgeous scenery.

Four members of the Pacific Venture plane, and a member of 13th Fighter Command at Manila. (Left to right) are: Sgt. Kenneth A. Maloney, Major Bob Krone, Cpl. Robert J. Krevitz, the Author and Sgt. Harlen W. Pullen.

A few days later we were enroute to Johnson Isle in a C-54, the first of two stops before Guam. About four hours after take-off from Hawaii, we were landing on this one runway bit of a coral reef. After eating some good Navy chow we climbed back into our plane for the next gas stop, Kwajalein. Eight hours later and with the loss of a day (one loses a day when going West on crossing the International Date Line) our transport landed on this small coral atoll. With some more Navy food under our belts we were in flight again. Another eight hours in the air and the seven mile wide and thirty-five mile long island of Guam came into view. I shall best remember Guam because of its intense heat, frequent daily tropical rains, and beautiful Turon Bay which, for swimming, put the world famous Waikiki to shame. Lack of legendary Hula girls at Guam, however, gives an edge to Waikiki's beach appeal.

We were slated to work five days on helicopter matters at Guam with USASTAF, but helicopter operations here were delayed due to lack of personnel. Demobilization was rapidly draining their units and flying activities were drastically curtailed.

Winging our way enroute to Manila, we discussed the Tech-order grounding the R-6s, wondering how long it would be in effect. Would we have to turn around and come back or would we have the opportunity of helping to prove the value of helicopters in Pacific rescue work?

Several days passed before there was any indication that our mission would succeed. Our original mission was based on war-time conditions and now with the end of the war men were headed for home, and all was confusion. Major Bob Krone, 13th Fighter Command Hdqs., was in charge of all Emergency Rescue Operations for the Philippines. He was keenly interested in employing helicopter within rescue units and came to our aid.

A few days later our 'copter crew' along with a few mechanics and pilots of the 2nd Emergency Rescue Squadron from Clark Field were busily unpacking and uncrating R-6 helicopters at dusty, shot-up Nichols Field. We were happy now in spite of the intense heat, dust, and poor maintenance facilities. Once again we were working on our crazy, beloved "egg-beaters."

Word gets around fast in the "islands" and it was but a day or two later that a dusty, beat up, old jeep came to a grinding stop beside us. Out stepped two Lieutenants, F. A. Cote, and Cowghill. They were two of the first group of helicopter pilots we trained at Freeman Field, Indiana. That seemed long ago. "Heard you were here,"—"glad to see you," the Lieutenants were saying, shaking our hands and squeezing our arms. Both were helicopter pilots with the ARUF's—Aircraft Repair Units, Floating. These units were Liberty ships converted into floating maintenance shops. They employed two helicopters, R-4Bs, for ship to shore shuttle service. The Army used these in the island to island invasion nothward to help keep our assault planes in the air by quick repair and supply of needed parts. Lt. Cowghill's ARUF was lying at anchor in Manila bay with an R-6 and R-4B on board, and were badly in need of help to get them flying. So after the coin flipping routine Sgt. Pullen won out. Next morning he was off by boat for the ARUF to see what could be done about getting the helicopters flying. One afternoon Lt. Cowghill came whirling onto Nichols Field, setting the R-6 gently beside us. Sgt. Pullen was with him. Cowghill was all smiles and thereafter we referred to Pullen as "troubleshooter." Maloney was later to earn a title also, that of coordinator. Kretvix was expeditor—this in addition to their reputation as excellent and well versed helicopter mechanics.

Lt. Cote's ARUF had been converted into a troop carrier after the war had ended and he was now assigned to Nichols Field Operations as Engineering Officer. He had two R-4Bs and one R-6, which Maloney, Kretvix and Pullen soon had flying. In the interim, Lt. Cowghill checked me out on landing a helicopter on the bow of a liberty ship, a truly postage stamp field.

While the assembly of R-6s and training of personnel was going on at Nichols Field, Sgt. Maloney and I were spending some time between FEAF Hdqs., and the supply depot at Nielsen Field, working on the procurement of aircraft, spare parts, and making arrangements for a factory technical representative, personnel and tech-orders. An operational plan was worked out in which it was decided to requisition from our Helicopter Training School, at Sheppard Field, twenty pilots and twenty mechanics. These were to be assigned to a helicopter pool at Manila. For the Philippines Emergency Rescue set-up the 2nd Emergency Rescue Squadron at Clark Field had four detachments; one at LAOAG in Northern Luzon, another at Clark Field in central Luzon, the third at PALAWAN in southern Philippines at Puerto Princessa, and the fourth at TACLOBAN in central Leyte. It was also decided to set-up two helicopters for each of these detachments to facilitate maintenance and eliminate parts difficulties.

With the end of the war, most of the ARUF activity had ceased. Everyone was busy converting these ships into troop-carriers in order to speed our troops home from overseas. Many of the helicopter pilots and mechanics had either been sent home or were assigned to land bases. From time to time we would see Lt. Feinberg, Lt. Carle, Lt. Immler, Lt. Chicolett and F.O. Green, all of whom were either waiting to go home or were doing other than helicopter flying. They, as well as Lt.'s Cowghill and Cote, had distinguished themselves and won the official admiration of Generals by their daring rescue of wounded from behind the lines during the heavy fighting in the Philippines.

One of the most daring was Lt. Carle, who on one of his rescue missions, was forced down near an American Infantry patrol. After destroying the helicopter with some bazooka shells, he proceeded on foot back to the American lines. En route he encountered a Jap sniper who fired at him. Lt. Carle quickly killed him with his forty-five. Another courageous pilot, Lt. Cowghill operating from his ARUF, rescued at least fifteen gravely wounded men from behind the lines while surrounded by Japs.

Incidentally, all these boys and their mechanics "kept them flying" with everything from bailing wiring to cannabilization. Many of the missions the boys were called upon to perform, were almost impossible to accomplish for the R-4B. Lt. Cote likes to tell of the Colonel who called for a helicopter and found him with a big coil of rope. "The Colonel," says Lt. Cote, "wanted me to hover above the thousand foot peak near Baguio, while he climbed down and made some arrangements with the troops below."

Needless to say, some of these helicopter pilots with their R-4Bs did almost the impossible because of no other alternative when the odds were greatly against them. Maybe that is why F. O. (Pappy) Green, in spite of all his awards, citations, and decorations for his helicopter work, swears he will "never fly another helicopter ever."

After a lot of hard work on the part of Kretvix, Maloney, Pullen, and the other mechanics, in getting everything installed, we were finally ready to test-hop our first R-6 out here. On November 12th, we took her up and found she needed a few minor adjustments. I then proceeded to give R-6 transition to all the R-4B pilots around while assembly and modification continued on the other R-6s. After less than two hours dual all were soloed and after five hours they were all ready to fly.

It was now getting towards the middle of November when one morning I was awakened very early by the telephone in my quarters. Major Krone from the 13th FC Hdqs. was on the phone. A giant Navy C-54, carrying eighteen passengers had crashed on its way from Guam to Manila into a mountainside about 70 miles east of Manila. Low clouds, poor visibility, and dense undergrowth had hampered any rescue attempts thus far and the Navy was calling for a helicopter to assist in the rescue.

On Okinawa, examining boatswain's helicopter rescue chair after the demonstration. (Left to right): the Author, John J. Sanduski, General Timberlake, Col. Eisenhart and Col. Kingsley.

"Would you please take a helicopter and mechanic and see what you can do?" came over the phone. I was wide awake now. Hurriedly dressing I called Nichols Field and told them to pre-flight and gas up an R-6. After awakening Sgts. Pullen and Maloney and Cpl. Kretvix and telling them the story, from the eager expression of anticipation on all three faces, I immediatly saw there was but one solution, and that was to "flip a coin." Cpl. Kretvix won out.

We all rushed out to Nichols Field in our old beat-up jeep, obtained our maps and information from a Navy representative as to the exact location of the crash, and were soon on our way. Upon arrival we tried to find a small clearing on which to land the helicopter, but we soon found this impossible due to dense undergrowth. We could get only an occasional glimpse of the survivors as they hacked their weary way toward the village.

Knowing that medical supplies for the injured were a prime necessity, Kretvix and I wheeled our "flying mixmaster" back towards the foot of the mountain and landed on the beach at Lamon Bay. There a Naval PBM was waiting with medical supplies and food for the group. Loading the R-6 with as many boxes of rations and medical supplies as we could get into the cockpit, with Kretvix designated as "bombardier," we went back to the spot where the sur-

vivors were barely discernable through the thick foliage. We made our "drop" and returned to PBM for more supplies. After several such "drops" we attempted to keep in view their progress from the scene of the crash to the beach, thus keeping the Navy posted as well as lending some moral support to the survivors. It was later learned that all of the food and medicine dropped were easily accessible to the party of crash victims and their guerrilla leaders, attesting to the skill of "Bombardier" Kretvix.

As it was now getting dark, and the survivors were not expected out of the jungle until the next afternoon, Kretvix and I flew our R-6 over to the nearby Filipino guerrilla village of Infanta, about four miles away. They were all quite excited about this strange contrivance and feted us royally. They gave us lodging and food, and wined us with "jungle juice" (a very potent native drink made out of Tuba root) and entertained us by singing and by recounting to us many gruesome tales of Jap atrocities. The Japs had killed about 5000 men, women, and children out of the 20,000 inhabitants. Many of the babies and children were killed by grasping them by the feet and smashing their heads against the numerous cocoanut trees. When they told us that we had been flying over an area in which there were an estimated 3600 armed Japs, we began to get funny lumps down our throats. Later we secretly contrived to fly another route on our way back to Manila.

The next afternoon, led by guerrillas, survivors began to come out of the jungle, and you may feel certain that they believe in the future and utility of this strange machine called a helicopter.

About the middle of December, we flew up to Tokyo in a B-25. We wanted to ascertain Depot facilities for helicopter assembly and to check on available trained personnel. There we found it bitter cold. Facilities were poor and there was no personnel other than myself. It was decided, threfore, to set up helicopter operations in Okinawa.

It was now approaching Christmas. One evening while we were sitting around talking and wondering what we could do to further our helicopter cause we hit upon a novel idea. We decided to play Santa Claus with a helicopter. The next few days before Christmas were spent in obtaining toys and making a Santa Claus suit for Major Alfred E. Smith, Jr., son of the famed "happy warrior." So on Christmas afternoon with our R-6 heavily loaded with toys and candy, Major Smith and I took off from Nichols Field and headed toward the Maryknoll Mission, in Malaban. Province. There some 2500 children, including many orphans were awaiting us. To me it was a never to be forgotten thrill to see so many happy and excited children, cheering as we alighted nearby. If we ever did any helicopter selling before we certainly did to these orphan children on that memorable Christmas day.

On January 4th, Maloney, Kretvix, Pullen and I, found ourselves on our way to Okinawa with the mission of setting up the 6th Emergency Rescue Squadron with R-6's. Lt.'s Zimmerman and Kelley picked us up in a jeep. They also had been in the first class of helicopter pilots trained at Freeman Field, Ind., had operated from ARUF's with their R-4Bs, and were now assigned to the 6th ERS at Okinawa. Many commendary missions had been performed by them with their R-4Bs around Okinawa and nearby islands. More interest and enthusiasm about the value of helicopters was evidenced here than in any other place we had been thus far, particularly from the standpoint of the "brass." Excellent cooperation was evidenced by all.

The next day, after meeting General Timberlake, the Commanding General of the 8th Air Force, and telling of our mission, arrangements were made with the Naha Air Depot to procure two crated R-6s. A few days later we had our helicopters and crews lined up and proceeded to assemble them near operations of the 6th ERS. One of the R-6's, the fuselage section, was damaged from having been dropped in transport, so we got permission to cannabalize it and drew another in its place. (No spare parts were available on Okinawa.)

In about 10 days our first R-6 was flying. There, helicopter conditions were perfect with the weather pleasantly cool and the field at practically sea-level altitude. Lt.'s Zimmerman and Kelley, after the normal amount of dual time, were flying and were greatly enthusiastic about the R-6. The mechanics likewise were picking up all the "dope" and learning quickly from my three "copter" men, Kretvix, Maloney, and Pullen.

Time was drawing near now when we were soon to return to the United States. The rescue modification kits, which Wright Field promised to send us, hadn't yet arrived in Manila. We were very anxious to demonstrate particularly the hydraulic lift winch to personnel in Okinawa. In lieu of this we decided to go through with my pet idea. It consisted of A CABLE SUSPENDED FROM EITHER SIDE OF THE HELICOPTER NEAR THE CENTER OF GRAVITY WITH A BOATSWAIN'S CHAIR ATTACHED THERETO. UPON SPOTTING THE SURVIVORS IN THE WATER, THE CABLE AND CHAIR WOULD BE UNCOILED FROM THE COCKPIT OR RELEASED FROM A CONTAINER SUSPENDED BENEATH THE MACHINE. THE PILOT WOULD THEN FLY, AND HOVER ABOVE THE SURVIVORS WHILE THEY GOT ON THE SEAT. WHEN ALL WAS SET THE PILOT WOULD RAISE HELICOPTER UP AND MOVE FORWARD.

After some lengthy preparations we were ready to put on our similated rescue with our boatswain's chair and R-6. I had made some trial pick-ups on land with weights and personnel, hovering and moving forward through the air to designated spots. We now had to try it at sea. For our demonstration we selected a place about two miles from Kadena Field, containing an excellent view out to sea, a small beach for the spectators to watch from, as well as a place to "lift" the survivors down from their 'perch.'

On the morning of January 26th we ran our demonstration with General Timberlake and his staff present as well as most of the pilots and mechanics of the 6th ERS. In spite of wind conditions of practically zero, I made four pickups—one "survivor" out of a dinghy close in (for the benefit of the spectators) and three "survivors" out of a dinghy about three-quarters of a mile out. The latter were "rescued" in less than ten minutes. All pick-ups were successfully and quickly made, with no rehearsals as far as the "survivors" were concerned. Our flying speeds were up to 40 mph with the "survivor" beneath flying streamlined and backwards into the wind with no unpleasant effects. The total weight of the boatswain's chair, cable and fittings was about six pounds. No landings were made until the last of the four "survivors" had been lifted to the ground.

Upon approaching land I would slowly dissipate air speed while losing altitude, hover, so that the victim could touch the ground, and after the survivor had left the seat, rise and go forward with the seat dangling beneath. This demonstration further proved the diversified talents of the helicopter, and that with certain adaptations, it could perform most any type of mission to do a specific job.

Lt. F. A. Cote, Lt. Carle and the author at Nichols Field during transitional flying on R-6 helicopter.

With the conclusion of our helicopter work on Okinawa, arrangements were made for a flight back to Manila. There after a week's work of compiling our report to the Commanding General of FEAF, we returned to our station at Sheppard Field, Texas.

So ended our Pacific Helicopter Veoture and our mission of "moniteering, indoctrinating and assisting in the setting up of helicopter operations within Air-sea rescue squadrons." We know that our many helicopter friends out there will help to further the cause of the helicopter and carry on its many useful tasks on the scattered far flung American military outposts.

ON THE TECHNICAL SIDE

(Continued from Page 30)

by the end of the war was comparable, in general, to that in the United States just prior to the adoption by the Army, in 1942, of the type D-8 low altitude balloon. It is interesting to note that the Japanese appeared content to use the balloons as a nuisance factor. Production never exceeded 5% of U. S. production. This can be explained partly on the basis of Japanese shortage of hydrogen gas.

JAPANESE BOMBING BALLOONS by G. E. Weidner, Army Forces in the Pacific Engineer Technical and Technological Survey, January 2, 1946, Dept. of Commerce Pub PB 28880, 36 pp.

The results of a technical survey of the development and manufacture of the Japanese Type A (10 meter paper) and Type B (9 meter silk) Bombing Balloons comprise this report. The scope of investigation was limited to the balloon proper as a carrier and the apparatus used for maintaining flight.

Three to five percent of the 9000 Type A class balloons launched from Japan are known to have reached the North American continent, and of the 20 experimental Type B balloons launched, at least one is known to have reached the North American continent and one reached its shore.

The data contained in the report were obtained through Japanese Army agencies and manufacturers who developed and produced this equipment. Detailed descriptions of the balloons, the flight control apparatus, the inflation and launching of the balloons, and the operation of the barometric switches are given. Discussions are presented of the methods employed by the Japanese in the development, production, and testing of these balloons.

Several short papers on Russian gliders have recently been released. These are translations from the Russian.

CALCULATION OF GLIDER LOADS by A. Borin, Army Air Forces Translation 15, Dept. of Commerce Pub PB 25233, 1944, 6 pp.

This report discusses the load factor experienced by the wing of a glider in towed flight, in gusts, and in areobatics. The load factor experienced by the wing under these conditions will be equal to the ratio of this stress to the stress experienced in normal horizontal flight. Calculations of excessive loads experienced by gliders are given tow loads, free loads, loads due to gusts, loads due to aerobatics, and the effect of the use of flaps on the load factor.

PROBLEMS IN GLIDER TOWING by I. Shelest, Army Air Forces Command Translation 16, Dept. of Commerce Pub 25234, 1944, 3 pp.

This article discusses three problems in glider towing: (1) the position of the glider with relation to the airplane, (2) the effects of gusts on the tow load, and (3) the required power of the airplane to lift an air train. Calculations are given for the calculations reached on each of these problems.

THE LEM-2 (OKA-33) POWERED CARGO GLIDER by O. Antonov, Army Air Forces Command Translation 17, Dept. of Commerce Pub 25235, 1944, 3 pp.

The LEM-2 powered cargo glider is an intermediary type between the flying wing and the conventional airplane. It consists of a wing with crew and cargo compartments in the center section enlarged vertically and in chord, and with a tail structure added for stability. The design of the glider, including power plant and controls, is described. Data is presented on calculattd speed, rate of climb, and performance. The report indicates that flight testing showed that an engine of greater horsepower was needed to make the LEM-2 an economical low-powered transport plane.

FLYING BY AUDITORY REFERENCE ("FLYBAR") by T. W. Forbes et al, Office of Scientific Research and Development Report No. 5123, National Defense Research Committee Report No. 17.3:169, Dept. of Commerce Report PB 22850, June 1946, 91 pp.

This paper comprises a report on the research at the Psycho-Accustic Laboratory on the development of the "Flybar" system of auditory signals by means of which the ears could take over some of the duties of "reading" flight instruments in order that ocular fatigue might be reduced and in order to allow the pilot to use his eyes for other necessary observing.

The project included the basic indications needed, as, for example, blind flying in ordinary flight, altitude, airspeed, and slip in dive bombing.

A comparison of auditory and visual signals for turn, bank, and airspeed for use in the Link trainer showed a similar course of learning for visual and auditory signals. It was the belief of the students, however, that the use of the latter signals made the learning operation more difficult.

Two appendices are included. Appendix A covers the development by the Bell Telephone Laboratories of an automatic annunciator for dial readings. This annunciator,

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AVIATION CALENDAR

Dec. 2- 4	SAE National Air Transport Engineering Meeting, Edgewater Beach Hotel, Chicago, Ill.
Dec. 12-15	International Aviation Celebration, auspices Chamber of Commerce, El Paso, Texas
Dec. 17	Tenth Wright Brothers Lecture, auspices IAS, New York, N. Y.

IT'S IN THE HAT

(Continued from Page 29)

Today, however, human effort has encompassed the world, reached the two poles, achieved fantastic speeds by road, rail, and air, plumbed the ocean depths, and ascended to stratospheric heights. Yet, in the newest, and possibly final, adaptation of air transport to meet the needs of the masses, pioneering has returned to our home towns, our golf courses, beaches and baseball parks—the landing places of the helicopter.

Thus the recent pioneering of the helicopter has met with favorable response, partly due to the excellence of equipment, and particularly to public reaction to helicopters; for now their need to travel the smaller distances, as well as the greater distances by air, was becoming acute since more people make short trips than long journeys. Herein perhaps we view the potential of the helicopter, whether it is applied to short haul between airports and city centers, or transport to relatively inaccessible places, flying "bus" services where deviations make normal surface travel slow and time losing, or whether it is just short quick hops to sports and recreational centers. It is obvious that in its present capacity with its high initial cost per passenger seat the helicopter can scarcely be called an economical means of transport. Nevertheless, it is certainly as reliable as the airplane was when the public started flocking to air travel.

A natural outgrowth of this condition was the corporation, Helicopter Air Transport, formed in Philadelphia at the commencement of this year, to operate helicopters on a commercial basis. It attracted many men, men who had been associated successfully with air transport for years, and their faith in the potentiality of the helicopter resulted in orders being placed for earliest delivery of suitable equipment.

Since this company (referred to hereafter as HAT) is the only one actually operating helicopters commercially, it has already built up a background of data and experience in a totally new kind of operation.

Not intending this to be a chronicle of the HAT, but in view of the unique position it has created and the results obtained from the first operation of helicopters commercially, I must inevitably refer to the HAT since their's is the only experience as yet available in this particular field of endeavor.

With these facts in mind Helicopter Air Transport undertook in September 1946, an experiment to confirm their belief in the advantages of the helicopter. Three Sikorsky S-51's of the HAT took off from South West Airport and landed on a plot off the Benjamin Franklin Parkway in Philadelphia, Pa., three blocks from the City Hall. Each machine carried a full complement of passengers. The normal transit time by road between the airport and the City Hall is usually forty minutes, but the helicopters covered the same route in five minutes.

It is unfortunate, but apparently necessary, that with anything new there is a more or less lengthy process of education. This is equally true of air matters. Looking back, this was evidenced after the last war, by the "barnstorming" which boomed throughout the country. Tough pilots with equipment that today give even the pilots that flew them a bit of a shudder, certainly were earning money for their owners, but they were also achieving something incidental, something avowedly not in the intended curriculum of barnstorming—education to the air. Many of our famous pilots made their bow to history through barnstorming, and the generation of today—the passengers of the fleet of the U. S. airlines, largely received their baptism of the air in the pastures and cabbage patches frequented as landing sites by the old time barnstormers.

So, in a lesser way, perhaps some kind of barnstorming appears to be a necessary corollary to the development of the helicopter—a more refined version possibly, and one that certainly will not last long. It is a medium of introduction and familiarization, and the HAT itself has not been able to forego this aspect. As a result, it has found itself the first Company to provide displays, as well as furnish passenger hopping to various display centers throughout the East. As confirmation of public reaction to the helicopter, it has been interesting to observe that many people, who for one reason or another, have experienced some latent prejudice to flying in a conventional machine, have had no hesitation in essaying the helicopter with an entirely satisfactory response.

The modern variation of this educational process in which the HAT has indulged, has provided varied samples of the versatility of the helicopter. Under the sponsorship of the Evening Bulletin of Philadelphia, Pa., a HAT helicopter landed on the beach of a well known resort in Ocean City, New Jersey, and effected a simulated rescue of a swimmer in trouble. At a warning blast from the siren, the helicopter took off and within 40 seconds was hovering over the "drowning" man, simultaneously dropping a lifeguard. A line was immediately lowered, and the lifeguard, who now had the victim firmly within his grasp, clung to the can buoy and in this way the two were towed to shore. The assembled thousands were very much impressed by the novelty of a helicopter being used as a beach patrol, and more by the apparent ease of its landing on the beach. In the future, visitors to Ocean City will find on the Boardwalk, a bronze placque portraying the S-51 in the process of towing the swimmers ashore, thus commemorating the occasion.

Among other flights carried out by the HAT in its educational program, have been landings at ball parks. On one notable occasion at Boston, each of the Red Sox players were to be presented with a fine camel hair coat by an enterprising advertiser. On a towel, placed purposely in the Stadium for the helicopter landing, the versatile machine gently settled with its front wheel right in the center of the towel, amid the plaudits of the crowd. For a helicopter this represents no trick, but seeing it for the first time creates a strong and lasting impression.

Then too, a well known Senator in the East has been using

a HAT helicopter for his electioneering campaign. It has enabled him to get to his more isolated destinations quickly, and land right in the heart of his constituencies. It not only enabled him to be present at many more meetings, but also saved considerable over-all time.

Golfing and fishing parties, and racegoers, have figured in the HAT educational curriculum, and the helicopter has been the ideal means of providing maximum recreation in a minimum of time. Busy executives, who have snatched a few hours for relaxation, have been loud in their praises for the helicopter, as having been the means of making possible a trip that otherwise could not have materialized.

Favorable comments have also been received from these passengers on the comfort of this form of travel—the S-51 is well sound proofed, and normal conversation is perfectly possible within the cabin. The ship is smooth, and the visibility from the seats is excellent. One enthusiastic passenger described riding in the helicopter as like riding in a "super-super Cadillac" with no speed cops, no traffic lights, and no pedestrians—just perfect automobiling!

Recently the HAT instituted the first charter passenger service by helicopter to the Atlantic City Racetrack in New Jersey. At the inception, the response was disappointing, but the occasional trips that were carried out brought a strong reaction, as the huge crowds could not fail to see the helicopter approaching and landing inside the racetrack some 50 yards from the Grandstand. Then, after the meeting, the helicopters took off and was out of sight before many of the racegoers had been able to even get their cars going at the parking lots.

Traffic began to build up—the regularity of helicopter trips was becoming very apparent, and many repeat bookings were obtained from passengers, who, once they had experienced the effortless method of getting away from a crowded race track, would not travel any other way. Toward the end of the meeting, the resources of the HAT were severely strained to handle the traffic, and many disappointed would-be passengers had to endure the traffic jams, delays on the road, fumes, and irritation, to which they had at least become accustomed before the advent of the helicopter service. The HAT believes this was the first time helicopter passenger service was advertised as a regular travel medium in the newspapers, and certainly the first time helicopter travel had added a new page to radio commercials.

In connection with horse racing, the HAT, in cooperation with Metropolitan Aviation Company of New York City, carried out a novel photographic experiment at Rockingham Park, Salem, New Hampshire. Many readers, no doubt, have seen the resulting newsreels showing for the first time, racing in progress, photographed from a helicopter, in the rear, keeping pace with the race—a complete and irrefutable record. The fundamental behind this project was to ensure that any objection could be examined beyond dispute. Some of the spectators took exception to the helicopter flying behind the horses. Not realizing that it was being done on their behalf, they blamed the helicopter for

"OUR SIREN SURE HAS HIM WORRIED!"

causing their own particular choices to be "also ran" instead of their own bad judgment for not picking the winners. No comment was forthcoming from those whose discrimination had been sounder.

During all the journeys referred to in the foregoing, which, at times, reached the stage of high frequency, the S-51 performed faultlessly, in conditions of high wind, rain, and occasional visibility limitations which grounded many conventional aircraft.

Our S-51s represent, at the moment, HAT's operational fleet, and these aircraft have rendered unquestioned service. It was anticipated—and confirmed by skeptics and the uninitiated—that maintenance problems would prevent any regularity of operation. However, the need for major maintenance has been extremely slight, and the theory of one hour's flight to three hours on the ground, bears not the slightest relations to proven facts. The only troubles that have evidenced themselves have been minor, and capable of rectification within an hour or so. Needless to say, the HAT's maintenance staff is highly skilled and experienced in helicopter requirements, having been drawn principally from the ranks of personnel who served with the helicopter branch at Wright Field, Dayton, Ohio.

The HAT also has on order, a number of the Bell 47Bs —an extremely handy and maneuverable litle ship with a fine performance. In this Bell production, the doubting

Thomases should have cause for further reflection. Larry Bell is an astute and successful aircraft manufacturer. By foresight and acument he has achieved a dominant position in the aircraft industry—and now he is backing the helicopter. Just pay a visit to the Bell plant and you will understand what real enthusiasm and conviction for the future means. Everyone is imbued with the spirit that makes things come to pass. Bell is certainly making their production line something for the critics to think about.

As the generous display advertising of the Bell Company clearly shows, their main appeal is to the industrial concerns, who undoubtedly will find in due course, that the helicopter can accomplish much more for them in less time.

Here an interesting point of view arises, and one which the HAT has found to the fore in negotiations with nationally known concerns. Just as the military mind of the past was slow to accept revolutionary methods of warfare until necessity proved the occasion, so it is in business.

Here is something new, and its proper place in the scheme of things it must be dissected and adjusted, and present methods modified to accommodate something as yet foreign to business thinking. This takes time. But presently, when the value of the helicopter is fully assimilated, and the adjustments effected, it will take its place as a valuable ally to business. Just as the car superseded the horse and wagon and as the airplane was brought into the business picture as a valuable adjunct, so will the helicopter assist to complete the circle, and prove a worthy complementary to these other transport pillars of commercial life. The time for this recognition is fast approaching, and the HAT is satisfied that when it takes delivery of the first Bell 47B for commercial operation, it will be put to use in a manner which must inevitably attract the attention of other potential users in the commercial field.

One indication is that recently the "Evening Bulletin" of Philadelphia, concluded a contract with HAT for the first commercial delivery of newspapers by helicopter. The schedule was successfully completed by HAT with only the slightest minute variations from ETA. The papers were delivered on a site within a few yards of the car parking lots, and were in the hands of consumers within forty minutes after leaving Philadelphia. This trial had real merit, for the result could not be attained by any other means of transport. All these achievements by the HAT prove that the helicopter transport business venture is a terrific success.

RESCUE SHIP AT GANDER

By H. I. Phillips

It's the plane that has the "know-how"
And the ship that has the knack;
It's the handy man of flying
With some stuff the others lack;
It's the nursemaid and the doctor
And the angel from the blue . . .
Tho' it isn't much on speeding,
It has lots of "I-can-do."

Sing of clippers and of transports,
Sing of fancy ways and speeds . . .
It's this pokey, plodding "copter"
That can top them in good deeds;
Sing of size and grace and beauty,
Cite the records great ships clinch . . .
It's this "windmill full of gas pans"
That can do things in a pinch!

Clumsy and not much to look at . . .
Awkward, gangling, slow and odd.
Yet a messenger of mercy
And a courier from God . . .
High toned liners, all de-luxury,
Had three strikes on 'em, and more . . .
But the "windmill" whispered "Steady!"
And came into to do the chore.

Eyes that stared from mangled bodies
Into skies that seemed so bare
Won't forget the ugly duckling
Bringing succor quickly there . . .
Minds that knew a frightful anguish,
How they'll hold the memory
Of this ship that heard a prayer
On a thumbworn rosary!

Just a flying hunk of plumbing . . .
Just a pinwheel and a trunk . . .
Just a sort of spinning clothes-rack
Called by big plane boys "that junk" . . .
Just a sort of maid-of-all-trades
Slow as if she had the gout . . .
But she got there to the dying
And she took the wounded out!

Good Samaritan of aircraft,
With a slightly tilted crown,
Clumsy angel with the know-how
When the vital chips are down . . .
Here's our brimming glass uplifted;
Tho' on beauty you ain't much,
Here's a snifter to you, sister,
For you've got the human touch!

—*Published through courtesy of New York Sun*

HELICOPTER AS A MEANS OF TRANSPORTATION

(Continued from Page 37)

In regard to road transport, I have read with interest the proposals for roads and highways, which have been forwarded by the Post War Reconstruction Committee of the British Road Federation, and which indicate a scheme of motor highways for fast motor road travel, and a number of schemes for road traffic in built up areas.

On this basis I have assumed, as a mean cruising speed for cars, 45 mph on motor highways, which includes occasional stops, and a mean cruising speed, in built up areas, of 16 mph. The corresponding cruising speeds for buses are assumed to be slightly less. Substituting, now, these figures in our formula for a mean effective speed of transportation, we obtain two curves C and D.

In regard to air travel by helicopter, I have assumed a taxi service. This means essentially, that aircraft do not fly according to the time tables, but meet exactly the wishes of the traveler. This would apply, of course, equally to the private owner's helicopter.

I have assumed twice as many helicopter stations as railway stations, excluding those of Urban and Suburban lines. Thus, for instance, Bristol and district would have 15 to 20 helicopter stations, and a smaller town, like Weston-s-Mare, 2 or 3.

On this basis, the average marginal time loss works out to approximately 20 minutes if considering that the cruising speed of the helicopter is of the order of 100 mph. The mean effective speed of helicopter travel, on this fact, is given by curve E.

We are faced now with a very interesting comparison between the various forms of transportation: the curves intersect each other, and it can be seen that the private car, or the taxi, is clearly the fastest form of transportaion for short journeys, whereas on the other side of the scale, the airliner is unchallenged.

I have excluded from this comparison the private owner's airplane, because it cannot fly at night—at least I would not—because it is too much dependent on weather conditions. However, a representative curve for mean effective speed is shown dotted in the diagram. If we observe the curve for the helicopter, we find that it is faster than any other form of transport for journeys between 10 and 400 miles. In particular, if we consider journeys of the order of 120 miles, we find that it is nearly twice as fast as any of its competitors.

To sum up, I believe the helicopter will be more expensive to run than a car, or a tax, but it will be by far the quickest means of communication for typical journeys in this country. For instance, from here to London, or from London to Birmingham, or from anywhere in England to New Market, or the sea-side.

There is no need for me to stress the fact that all the figures which I have quoted, have been, of course, to use the popular phrase, "cooked" to a considerable extent, and the conclusions at which I have arrived are highly optimistic.

Nevertheless, think of the possibilities: the chance to free yourself of cross-roads and roundabouts, of speed limits and stop lights, of time tables and waiting rooms! Think of the wing that flies in circles, but will give you the pleasure of traveling straight!

* * *

ON THE TECHNICAL SIDE

(Continued from Page 42)

which translates a dial reading into its spoken equivalent, uses a magnetic tape with 24 channels that operate continuously. Appendix B discusses by questions and answers the various problems in flying by aural indications. In addition the second appendix suggests possible future applications of the "Flybar" equipment.

"AIRCRAFT PRODUCTION DESIGN" by James E. Thompson. Aviation Press, San Carlos, California. Illus. 230 pp. $5.00.

The author is Chief Engineer of Booth Manufacturing Co., to whose credit are the books "Aircraft Drafting Room Manual," "Aviation Service and Maintenance," and "Manual for Aircraft Hydraulics." This work belongs to the "Cadet Engineering Series," and had its origin many years ago. It is based on his personal experience while collecting the production design data and later was published in magazine articles. He also presented them as a course on "Aircraft Production Design," at the University of Southern California, and, finally, revised and amplified them into the form of a book. The contents assist the areonautical draftsman and designer to understand better the tools and processes used in manufacturing the designs, embodying the maximum possible practicability and economy. Many photo illustrations of North American and Consolidated-Vultee Aircraft Corporations are offered. Nineteen sections cover many interesting technical problems, such as simplification of design and manufacturing, practicability of assemblies, serviceability and interchangeability, repairs of metal riveted and welded structures, repair of wood airframe structures, lubrication as factor in design, etc. Die casting, mold and centrifugal castings as well as all kinds of welding are described in detail. The reader may find many practical suggestions from straightening of tubes and tubes splice designing to forming sheet metal parts and classification of standards and data in standard handbooks. The book also includes many valuable up-to-date informations of very practical nature, for instance, on drilling holes through angular surfaces, and many others. Tables and sketches facilitate the use of this book in a shop, drafting room, or design office, was a handy reference manual.

(Continued from Page 5)

EXPLORING BY HELICOPTER

Walt Bonney of Bell Aircraft Corporation has informed us that his company has leased a helicopter for the summer to the Lundberg-Ryan Air Exploration Company who has already purchased another from Bell for delivery in the near future. Everyone at Bell is very enthusiastic about this new Canadian project which is known around the plant as "Operation Muskellunge." The first helicopter was taken to Sudbury, Ontario, about 250 miles northwest of Toronto. In this remote Ontario community Dr. Hans Lundberg is using the helicopter extensively to demonstrate the effectiveness of the magnetic-electronic equipment he employs in his geophysical surveys. Both the functioning of the Lundberg apparatus and the operation of the Bell Model 47 in the initial work was brilliantly successful.

* * *

"OFF-THE-SHELF" PURCHASE

In its recent acquirement of two new model personal airplanes at Wichita, Kansas, the Navy consummated what was probably its first "off-the-shelf" purchase of private aircraft. The Navy Department contemplates using Culver Model V ships for further radio-control experimentation mainly because its high ratio of speed to horsepower makes it particularly adaptable to radio control. It has the same clean lines that graced the prewar Culver, but is a considerably faster plane. The Model V features an electrically retractable tricycle landing gear which was originally developed by Culver engineers for their radio-controlled models to withstand the rather hard pilotless landings. One of the most vital requirements for a radio-controlled aircraft is that it be spin-proof and according to Culver officials, the Culver Model V is spin-proof.

* * *

RESEARCH FOR QUIETER PLANES

As a result of noise research being conducted by aircraft manufacturers, the Aircraft Industries Association has announced that quieter planes will not only be possible but are a promised improvement. Findings are expected to be applicable to both military and personal planes. A noise reduction subcommittee of the AIA's Aircraft Research and Testing Committee on the West Coast has been working since early this year on the problem of reducing passenger fatigue and increasing in general the comfort of air travel. Any reduction of noise in aircraft would of course benefit those on the ground also. Development of a portable sound meter permitting accurate charting of noise levels within an airplane is one of the first steps in this direction, but studies have also indicated a definite need to redesign propellers and modify engine exhaust systems.

CHINA TO BUILD "JENNY"

The Boeing Kaydet PT-17 is going to be manufactured in China to aid in building up the Chinese Air Force. A license agreement giving China this right has been signed in Washington, D. C., by J. E. Schaefer, Boeing vice president, and Lieut. Gen. P. T. Mow, deputy chief of the Commission on Aeronautical Affairs of the Republic of China. Boeing will conduct a general familiarization course in manufacturing and other procedure in connection with the primary trainer for the benefit of eight to ten Chinese technical personnel in addition to Lieut. Col. H. C. Tang, representative of the commission, and his assistant, Lieut. C. C. Huang who are now stationed at the Boeing plant in Wichita.

* * *

BOEING 'GAPA' MISSILES

Boeing Aircraft Company has launched a new supersonic guided missile program which has been formed to develop pilotless aircraft which will be able to locate and destroy any enemy aircraft or missiles threatening America's shores in time of war.

Boeing will fire 60 missiles this year. Up to now the project has been secret and its details are still classified as confidential military information. Boeing is undertaking the entire job of research, construction and test-firing and is believed to be the only company in the United States to be managing such a project completely on its own. It now has a 30 man staff at Wendover, Utah, who do the actual testing, and the Seattle plant has other engineering staffs engaged in further details of the GAPA missile.

Named for Ground to Air Pilotless Aircraft, the GAPA is a pencil-slim ten-foot rocket designed to be an "aerial destroyer." The first test models are propelled by standard Aerojet rocket units. In the present models a booster power unit is attached to the tail of the missile to accelerate it to supersonic speeds in a few seconds.

* * *

'COPTER BLADE FIRM STARTS PRODUCTION

The first set of rotor blades to roll off the assembly lines of Universal Helicopter Corp. will go to Bendix Helicopter, Inc., who has placed an order for five sets. Mr. George P. Martin, Vice President of the firm, announced that he plans to expand production facilities and to increase employment. He also disclosed that Universal is working on a new all metal rotor blade equipped with tip lights that will permit helicopter night operations. Lou Leavitt, Operations Manager for Helicopter Air Transport Corp. of Philadelphia, recently visited the plant to discuss replacement of rotor blades for Sikorsky helicopters which the company is now using. Other firms which have placed orders for rotor blades are: Firestone Helicopter, and DeLackner Helicopter, Inc.

AIRBORNE MAGNETOMETER

It has been reported that helicopters carrying apparatus to detect anomalies while surveying terrain from the air will provide a new method of geophysical exploration in Canada. The apparatus is said to consist of a generator, an oscillograph with a gridded scan on which differences of magnetic intensity are recorded; two synchronized electric coils which rotate in the earth's magnetic field, cutting across the lines of force; and two motion picture cameras.

UAL USES SPERRY GYROPILOT

United Air Lines is the first commercial airline to install the Sperry A-12 Gyropilot. This new electronic device permits precise automatic instrument approach to an airport runway. In the above photograph, V. H. Webb, United pilot, is shown making an elevator trim adjustment by virtual finger-tip pressure applied to the Gyropilot controller.

One of the unique features of this signal system is that the A-12 Gyropilot is so tuned to the aircraft's flight characteristics that the need for any manual sensitivity adjustment to compensate for the difference between rough air and smooth air is entirely eliminated. In addition, new flying comfort is assured because the control corrections are applied before the aircraft's attitude changes appreciably which eliminates unnecessary flight attitudes, so uncomfortable to passengers and personnel.

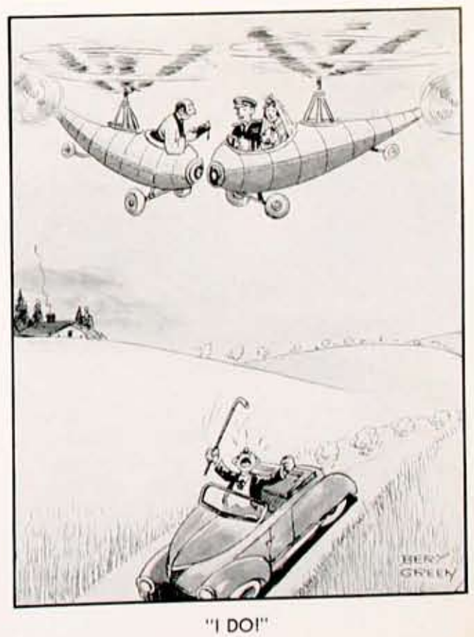
Mr. W. A. Patterson, President of United Air Lines, announcing the first of similar installations in United's four engined fleet, said, "This is a definite start in eliminating weather as an obstacle to airline operations and, eventually, to complete regularity of schedules."

ARIZONA ENTHUSIASTS

Edwin J. Montgomery, president of the Southern Arizona Airlines, Inc., is another prominent commercial airways figure who is sold on the future of the helicopter. He has left Tuscon for Buffalo, N. Y., where he is taking a helicopter pilot's course in preparation for the acceptance of delivery of a two-place Bell Helicopter, the first to be bought for the Arizona Helicopter Service.

An application is before the aeronautics board and, if granted, will add the carrying of airmail to the already planned charter service in Arizona. A subsidiary of Southern Ariona Airlines, Inc., this new helicopter service has issued invitations to Gov. Sidney Osborn and the four members of the state corporation commission to be flown by helicopter to their statehouse offices. This flight will mark the inauguration of operations by the Arizona Helicopter Service.

Mrs. Edwin J. Montgomery, also a helicopter enthusiast, has been speaking in New Mexico where she showed colored motion picture film outlining the varied uses of rotor craft. The Montgomerys plane a future tour of the state in a helicopter giving demonstrations and showing films for educational purposes. Other organizations wishing to see the film may contact their office and place a request.



"I DO!"

BENDIX AIRCRAFT RECEIVER

The Radio Division of Bendix Aviation Corp., has bounced into the field of personal plane radio with a neat little two-band aircraft radio receiver weighing only five pounds, including power supply and shockmounts. The PAR-70, will provide for reception of broadcasts, radio range signals, control tower directions, and—when a loop antenna is added—will allow aural-null navigation. The product of many years of extensive research and engineering in the development of aviation radio equipment, it is of minimum size, maximum utility, light weight, high quality, and dependability, which have been major considerations in the design of this unit.

* * *

SERVICING LARGE AIRPORTS

Helicopter may be used in servicing large airports. They could be useful in such everyday work as daily inspection of runways and approaches, checks on possible damage to boundary lights, conditions of painted numerals or guide lines, and so on. It appears that the overall coverage of the helicopter is such that these tasks could be done much better from a helicopter than by automobile.

* * *

FOR COMMERCIAL USE

Many firms have already submitted applications to the Civil Aeronautical Board for commercial use of helicopters. Among department stores awaiting CAB action are Gimbel Brothers, Pittsburgh, Pa.; Wm. Filene's Sons Co., Boston, Mass.; The Hecht Co., Washington, D. C.; Thalhimer Brothers Inc., Richmond, Va.; "Shannons," Fort Worth, Tex.; Milwaukee Boston Stores, Inc.; and Mandel Brothers, Inc., Chicago, Ill.

Among surface carriers seeking to engage in helicopter air tronsport are the Yellow Cab Co., Cleveland, Ohio, as well as its branch in Philadelphia, Pa.; the Checker Taxi Co., Boston, Mass.; North Little Rock Transportation Co.; Greyhound Corp.; and Red Star Way, Inc.

* * *

CARLAT'S JET ROTORCRAFT

Mr. Serge Trey, President and Chief Engineer of Carlat Enterprises, which is located at 153-16 Tenth Avenue, Whitestone, N. Y., has revealed that the company is in the process of constructing its own model helicopter which will combine the most outstanding features of the helicopter and the autogiro. The Carlat Helicopter will be built without the complex machinery necessary in the shaft of ordinary rotary wing aircraft. Incorporating a simple air shaft, devoid of machinery, the machine will be driven by the suction of air which is forced through the shaft and then conducted out of the edges of the rotary wing. This new jet helicopter being visualized by the Carlat Company, will be capable of carrying more passengers and cargo, and will require less landing and take-off area, with the ability to fly faster and higher—all because of a minimum of drag. This new modern jet principle has tremendous possibilities of eliminating wing icing also because the shafts of air coming out of the wing will be hot and will melt the ice before it has a chance to form. The fifteen years of research and design, which form the basis for this principle, holds promise of building safe, comfortable and efficient airplanes and helicopters, available in the lower-price ranges before much time has elapsed. Those interested in buying a jet plane, or in seeing the principle demonstrated, are invited by the Carlat Company to contact Mr. Harry Bruder, Sales Manager, whose offices are located in the Whitestone plant.

AIRWAYS EYE THE FUTURE

Wiggins Airways of Boston and Norwood has added its name to the fast growing list of future helicopter transport companies. An application has been filed with the Civil Aeronautics Board at Washington for permission to use helicopters for transportation of passengers, mail and goods. The company plans to fly helicopters directly to the business centers of 53 eastern Massachusetts cities and towns, linking them with Boston and with each other. This will offer air transportation to most of the communities for the first time. They are also requesing the right to fly the machines from the airport at East Boston to the downtown Boston area.

* * *

NEW WHIRLIGIG ENTERS FIELD

A new, low cost helicopter developed by Paul Nemeth, President of Nemeth Helicopter Company of Chicago, Illinois, was recently inspected by Public Works Commissioner Hewitt and Walter Wright, superintendent of Parks, Recreation and Aviation. Mr. Nemeth informed the officials that the craft was designed to sell for $2,800 and that it can cruise at 85 mph, with a top speed of 95 mph. Its gasoline consumption is very low, and it can travel 22 miles on a gallon of gas. The helicopter weighs 575 pounds, but can lift 960 pounds. It is powered by two 30-pound, 30 hp engines, which propel two rotors.

NEWS • VIEWS • AIMS

HELICOPTER SETS THREE RECORDS

Three international helicopter records were set in a 1,000-kilometer flight between Wright Field and St. Jacobs, Ill., it was announced by Air Materiel Command officials recently.

The records were set by Majors Dale M. Jensen and William C. Dodds, and included duration, elapsed time and average speed. The duration mark was ten hours and seven minutes. The 1,000 kilometer course from the field to St. Jacobs and return was flown in nine hours, nineteen minutes. The third record, average speed over the closed course, was 66.6 miles per hour.

BELL HELICOPTERS TAKE TO AIR IN MILITARY FORMATION

This unusual picture shows seven Bell Helicopters taking off in formation. Hovering off the ground in the foreground are coupe-cabin types Bell is now building commercially.

Note copters with bubbles instead of metal cabins, which Bell uses for such specialized purposes as schooling. At far end are those used on proving and development projects. All are Model 47's.

R-6A IN ROLE OF EXTERMINATOR

The Emergency Rescue Squadron came into the spotlight recently when a mined area near Naha, Okinawa became rat-infested. Too dangerous for rat-poisoning teams to enter on foot, the area was bombarded with poisoned bait pellets by a 1st Air Division 6th ERS helicopter hovering ten feet off the ground. 'Copter was manned by Capt. Fred Redewald of the 182nd Malaria Controls Detachment, Staff Sergeant Wallace J. Lund, and pilot, Lt. Wayne W. Eggert of the 6th ERS.

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