FLYING SAFETY

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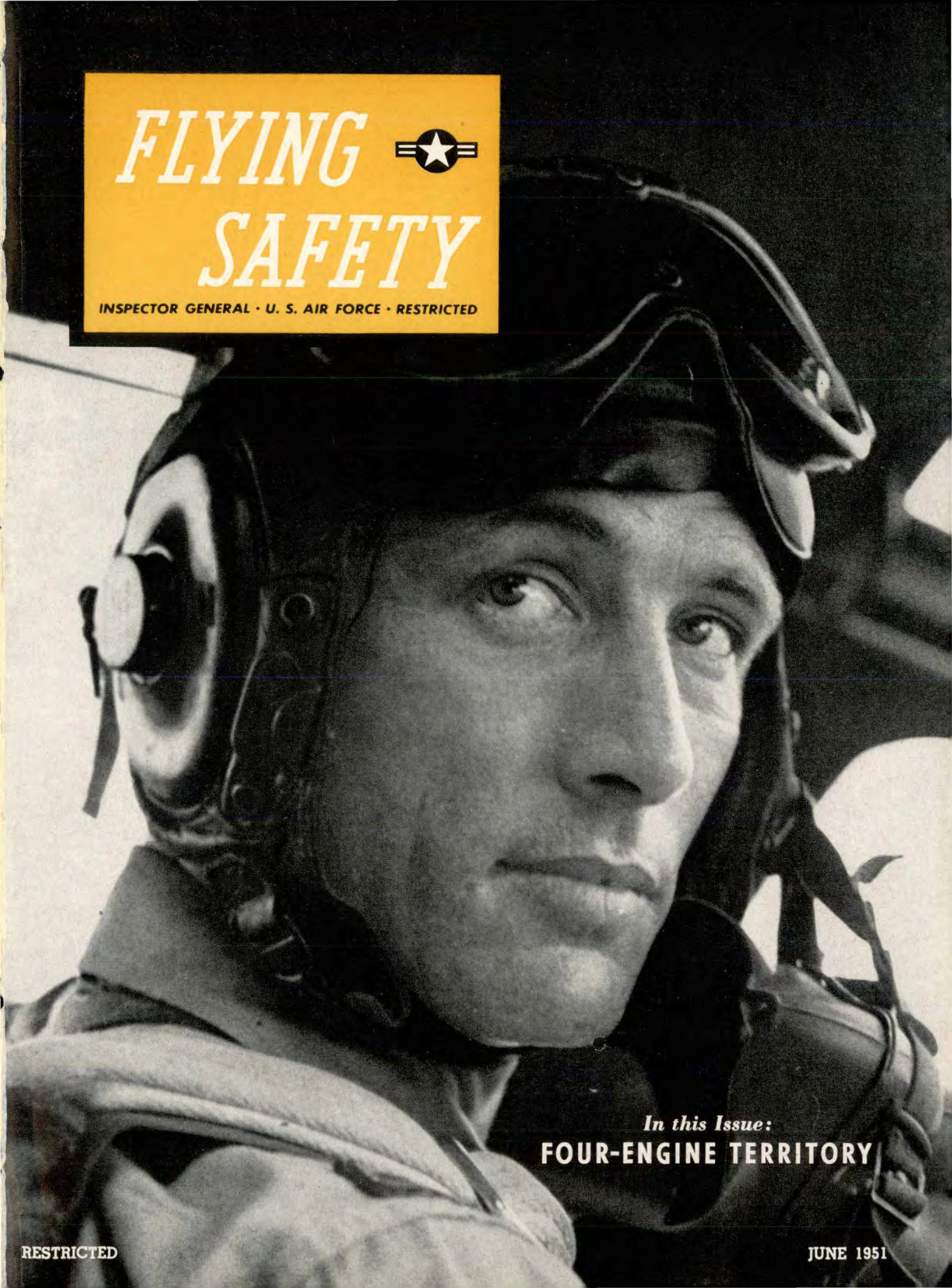

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SAFETY
and
PROJECT SPRING RE-SUPPLY, 1951

THE ANNUAL SPRING RE-SUPPLY of the far-flung arctic weather stations presents many challenging problems in operations, logistics and, yes, in the humantics. All must be considered. Though never a "milk run," this airlift project can through research, careful analysis, thorough planning and enlightened leadership be made operationally sound with a minimum of risks.

Project SPRING RE-SUPPLY, 1951, aided by favorable weather, was accomplished with dispatch and a commendable degree of safety. But behind this accomplishment were innumerable, less spectacular but necessary actions and factors. Perhaps a brief look behind the scenes would be helpful.

Planning took substance in January 1951, at the conference in Ottawa attended by representatives of the Royal Canadian Air Force (RCAF), Canadian Department of Transport (DOT), U. S. Weather Bureau (USWB) and the U. S. Northeast Command (USNEC). Given operational control of the 1951 airlift, the USNEG immediately drew up a flexible operations plan permitting the Project Commander maximum latitude and authority of decision. Concurrently, the RCAF prepared and improved living, parking and operating facilities at Resolute Bay; the RCAF and the USAF readied their aircraft for arctic operations; and at the appropriate time, the DOT and the USWB prepared ice and land airstrips at the arctic weather stations.

Re-supply in 1951 was scheduled to begin 15 April—a full month later than in 1950—because experience had taught that the earlier date did not capitalize fully on moderating weather and increasing hours of daylight. This year, higher temperatures—though definitely not warm by temperate zone standards—coupled with the daily 20-hour average sunlight substantially favored aircraft maintenance and availability.

On the premise that ultimate success, in this as in any endeavor, hinges on the human element, great care was taken to select personnel having the greatest experience and demonstrated skill in arctic operations, and possessing the proper qualities of physical stamina, intelligence, initiative, force, and above all, team spirit. Those selected were given thorough indoctrination and pre-operations training.

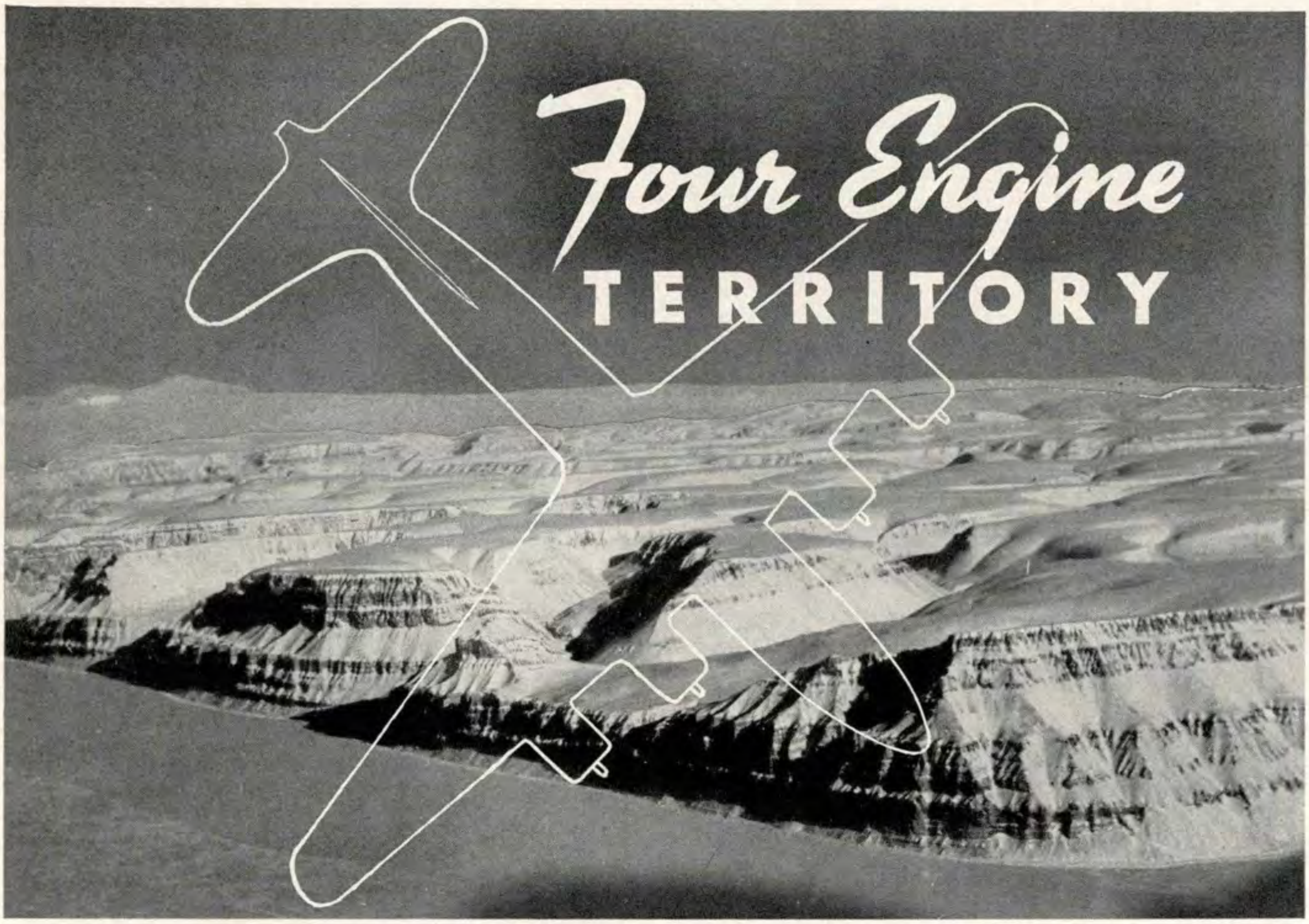
We were fortunate this year in having a nucleus of personnel experienced in former re-supply projects despite the short tour of duty in this Theater. And to insure a carryover of experience into next year, new personnel were teamed with the arctic veterans.

In summary, the 1951 Spring airlift was characterized by increased efficiency due to better living, working and operating conditions at the advance bases, effective scheduling, team spirit and favorable weather—all of which contributed to round-the-clock operations which at one station reduced turn around time on the ground to only thirteen minutes.

For a job well done and one calling for unstinting physical, mental and moral effort, I emphasize my sincere admiration and respect for the Project personnel of the RCAF, DOT, USWB and the USAF.

Lyman P. Whitten

L. P. WHITTEN
Major General, USAF
Commander in Chief
U. S. Northeast Command



Four Engine TERRITORY

When They Fly Re-Supply Missions Into The Arctic, NEAC Aircrews Know There's Nothing Like Experience And Multi-engine Planes For The Payoff in Safety

THE DATE WAS FRIDAY THE THIRTEENTH, and it was just before noon, Goose Bay, Labrador, time, when the red-tailed C-54 taxied out and with a squeal of brakes, squatted heavily at the end of the runway. Inside the cockpit the flight crew—Plane Commander Captain George T. Coen, Lt. Col. Frank B. Wagner, and M/Sgt. William C. Deady—started religiously through a long checklist.

A few minutes later, after the engines had been run up and the checklist was completed, the navigator, Capt. Glenn S. Messenger, called out the initial heading to Frobisher Bay, NWT—this was Crystal II, little more than a single 6,100-foot landing strip situated more than 700 air miles to the north—and all aboard got set for the takeoff. No one had mentioned the fact that the date was the thirteenth. But to these Air Force men of the Northeast Air Command's 6603rd Air Base Wing at Goose Bay, Labrador, it wasn't a date that they were concerned about—it was good weather because the mission was a cargo flight in the Spring Airlift phase of Project Re-supply for 1951.

Making a long takeoff run, the C-54 grossing 73,000 pounds for a maximum load, lifted heavily into the air. The cargo of supplies and equipment was for ultimate delivery to five lonely weather stations isolated in the Arctic and operated jointly by the United States and Canada. As the plane climbed to an established cruising altitude of 9,000 feet the radio operator, T/Sgt. Charles W. Owens, sent the first position report. From here on out he would be sending these reports every half-hour.

Stirring restlessly in the crew compartment just forward of the tank room on the C-54, were members of the relief flight crew: Major Larry J. Keyes, pilot; 2nd Lieutenant C. S. Lampard, ARS navigator, and M/Sgt. Richard A. Paulin, engineer. These re-supply missions into the Arctic were energy-draining for both the USAF and RCAF crews who took part in the around-the-clock flying, and a relief crew was mandatory. To these men, flying in the Far North had its risks and many long, tiring hours stretched ahead.

And more than 60 hours later the tired crews on this particular re-supply flight arrived back at Goose Bay to end a mission that was typical of the speed with which the spring airlift was completed this year. Only one accident marred the otherwise outstanding Flying Safety record of the airlift. Lt. Col. Marshall McGovern, project officer for the airlift, cited continuous flying, good weather, and experience for the success of the spring phase.

Crew chiefs wait for the signal to push out bags of mail which were dropped to (below) one of the weather stations in Far North.

"The Spring Airlift this time was smaller than last year," he said, "and we gave the job to aircrews who had considerable flying experience in the north. Also, we started operations a little later and took full advantage of some very good weather to schedule the flights for continuous operations.

"The experience gained from past re-supply operations was also helpful in the completion of this year's project," McGovern said. He gave full credit and compliments to the airlift crews and to the maintenance men whose combined work pushed the spring project to completion in just a little over two weeks' time.

A cold, tough job for any organization, Project Re-supply is the code name for the yearly re-supplying of the weather units in the north. These Arctic weather stations, all in the Northwest Territory, included Eureka Sound, Resolute Bay, Mould Bay, Isachsen Bay and Alert Bay. Of these, Alert is the northernmost U. S. weather unit in the world, being located on the northern tip of Ellesmere Island, 2,000 miles from Goose Bay.

These weather outposts, separated from each other by hundreds of miles of frozen, barren land, were built in recent years in accordance with an agreement between the United States and Canada. The permanent structures were furnished by Canada while the U. S. provided the temporary installations, equipment and fuel. Half of the personnel to man the stations came from each country, with Canada having a civilian officer in charge and with a senior American civilian acting as executive officer. Transportation, both sea and air, was provided by the United States.

In order to carry out Project Re-supply missions, the moving of the supplies was divided into four separate operations: Spring Airlift, Summer Sea Supply, and the Fall Airlift. The fourth phase was the Winter, or Christmas drop, carried out in a C-54 round-robin flight from Resolute to all of the weather stations. In this phase bags of mail and presents were dropped when the plane flew over the station. Since the weather units were located far above the tree-line, Christmas trees were included in the drops. This winter mission was hard on the aircrews because it was flown in the darkness of the arctic winter. Monthly flights were flown to augment the normal movements and these carried mail and other necessities to the personnel isolated at the weather stations.

Subsequently, the Northeast Air Command, under the able direction of Maj. Gen. Lyman P. Whitten, was delegated the overall responsibility for the airlift por-

For a Christmas mission to the weather units last year presents were packed for dropping to the personnel at the stations.

An RCAF North Star loaded with drums of high-octane fuel on a re-supply flight from Resolute flies over a frozen wasteland.

tion of the project, with the following assisting agencies: Air Rescue Service, Air Weather Service, and Airways and Air Communications Service. For the Spring Airlift phase the 6603rd Air Base Wing at Goose Bay, Labrador, headed by Colonel Roger V. Williams, was designated the operating agency. The RCAF North Star planes and crews furnished by Canada operated from Montreal.

Essentially, the Spring airlift consisted of transporting the supplies from an advanced base of operations—like Resolute Bay—in to the satellite stations. These supplies had lain in cache since the previous summer. This year, as in 1950, the airlift was carried out in the early part of April, when good flying conditions existed and when the temperature was such that the ice could be used as landing strips and while the maximum hours of daylight existed.

Four aircraft—two USAF NEAC C-54's and two RCAF North Stars—this year were flown a total of 52 Re-supply missions to haul more than a half-million pounds of cargo in to the weather units.

Difficult to get in and out of because of the often unpredictable arctic weather conditions and icy landing strips, the re-supply missions to these tiny weather outposts demanded the utmost in experience and teamwork from the American and Canadian flight crews. This was particularly true from the navigator's and pilot's standpoints . . . for in this snowy land of long distances there were no en route radio aids to flight or convenient airways, and the North Magnetic Pole was south of most of the area that was flown over.

At Isaacson, Captain Williams watched from the plane as Lt. Col. McGovern fastened a shackle on tow sled used to haul away cargo.

In the RCAF mess at Resolute, tired USAF crews ate big meals and relaxed after round-robin cargo flights to other stations.

While the men thawed out momentarily, the Huskie dogs took life easy at Resolute. At night temperature hovered around 22° below.

Literally, this lack of aids and alternates created a "four-engine territory" for the cargo flights—it was no place to be caught with one engine out on a heavily loaded twin-engine plane. The only alternate the re-supply pilot could list was the station from which he had just departed. Twin-engined aircraft were used with unsatisfactory results in last year's operations.

Without the familiar radio aids, maintaining course for the airlift flights in the higher latitudes was a difficult job. A navigator was a necessity and he had to be good. Captain Maxwell E. Osborn of the 6603rd Wing, who has logged considerable flight time in the north, explained that he kept a running check and triple check when flying on a polar mission. The course flown was plotted by the "G" or grid system. In using this navigational technique, Captain Osborn substituted a grid for the meridians and parallels of the aeronautical chart and grid directions for geographic directions.

"Navigation is a painstaking job on missions in the

A landing accident near the completion of Project Re-supply happened at Resolute Bay when a C-54 pilot did not correct for cross wind.

Refueling the C-54's and North Stars from snow-covered drums was a cold and snowy job for personnel at the weather stations.

polar regions," said Captain Osborn. "For flights over great distances and in fast airplanes near the north pole above 75 degrees North Latitude, the present magnetic pole system of navigation is useless."

"When flying the polar regions, a lot of the land area is inaccurately plotted and meridians of longitude are crossed too often in flight to make the ordinary system of navigation practical," he said.

"The APS-10 radar scanner in the airlift 54's was a very important instrument to both the navigator and the pilot. Besides making drift and ground speed readings with it when flying under instrument conditions, it has been used in making letdowns with aircraft," Captain Osborn explained.

Although a majority of aircrew personnel assigned this year's airlift missions knew the north and had taken Arctic Indoctrination Training, they received a thorough briefing before the project got underway. In addition, the navigators had a review of grid navigation and studied problems which they might encounter. They were issued the SOP's and almanacs and warned of the inaccuracies of the charts. Each navigator unfamiliar with the route was route-checked and familiarized with prominent landmarks.

For the crews, there was good reason in all of those careful preparations. From Goose Bay to Crystal II the minimum instrument altitude for the re-supply flights was 9,000 feet. The two radio aids available were the Goose Bay and Crystal II radio ranges—and the latter was unreliable for any distance. HF/DF could be had from Crystal II, but only on 30 minutes notice.

Except for a short time over Hudson Strait, the flying was over some rugged terrain. For a while the flight course paralleled the Labrador coast with its many inlet fiords that served as checkpoints. Then the course line crossed the Hudson Strait, to the left of Button Island, Resolution Island and the Lower Savage Islands, before it touched the southern tip of Baffin.

From here, the flights went over rising terrain that ranged up to 3,500 feet before reaching the northwest sections of Frobisher Bay, the location of the Crystal II landing strip. Aircrews knew that if an instrument approach had to be made here, snow-covered hills rose to heights as high as 500 feet a short half-mile away from either side of the runway, that the closest alternates were BW-8, Crystal I—or Goose Bay.

But this was just the first leg of the long hop north. From Crystal II the airlift missions covered a distance of over 850 nautical miles to reach Resolute Bay. And after leaving Frobisher Bay, the magnetic and flux-gate compasses were useless. Before taking off, the navigator had set the grid heading of the runway on the gyro turn indicator and after the takeoff, when the plane had reached cruising altitude, he had reset the gyro, using azimuths determined with the astro-compass. Thereafter, he checked the gyro every 20 minutes and determined the rate of precession.

Had the navigator been unable to get an azimuth shot on the sun or other celestial bodies, the flight would have returned to Crystal II.

There were radio beacons at Resolute and the other stations but they had very limited range and, since there was only a limited power supply available, they were turned on only when requested. The route to Resolute was over barren, uncharted territory, and the checkpoints were few and far between and had to be identified on the charts with caution.

Even for the men like veteran 6603rd pilots, Capt. Donald E. Williams and Capt. George T. Coen, who were experienced in arctic operations, pilotage was difficult, due to low coastlines merging with the sea ice or with sky, horizon and earth melting together in a milky whiteness. And from Resolute to the stations farther north the land masses were more indefinite and harder to identify.

Despite the known conditions of the polar regions, SOP's varied with operations. Temperatures, winds and weather were all taken into consideration for airlift flying.

"Aircraft operating in and out of the north must be fully winterized or they soon go to pieces," said Captain Coen. "In previous operations, airlift planes left in the open for a day or two at a northern station soon needed a lot of maintenance to keep 'em flying. Struts went flat, fuel tanks and hydraulic lines leaked and under wind conditions brake drums and open engines were blown full of snow."

Blowing snow, said Captain Coen, was the most frequent cause of flight cancellation. Under this condition snow was picked up from the ground by the wind and blown about in clouds and sheets high enough that vertical and horizontal visibility was often reduced to zero.

"There was a definite need for a better type wing and engine covers," said Coen. "In bad weather heavy canvas covers would freeze and short of thawing them out there was no way of getting them on the aircraft. In any kind of a wind they were impossible to manage."

Flight technique, or experience, in the arctic was little different from winter flying in the northeast part of the U. S., according to Captain Williams. "Probably the coldest station was Eureka Sound," he said. "Actually, at the other stations last winter the temperatures didn't drop much lower than 35 degrees below zero. Snow, when it came, never got much over a couple of feet deep. But the wind blew it into terrific drifts packed hard enough, in most cases, to easily support the weight of a man," he added.

Arctic operating SOP's set up by the 6603rd Wing included carrying all types of survival and emergency equipment, spare parts and fly-away repair kits on aircraft, RON procedures, communications procedures, snow landings and deep snow takeoffs.

The RON procedures used covered eight points: engine covers on at temperatures of minus 10 degrees and below; parking brakes off—after engine dilution aircraft moved forward to insure that the brakes are free; hydraulic pressure pumped off with brakes; cowl flaps closed; carb heat in the hot position; gas selector valves in "Off" position; throttles open, and the plane parked into the wind.

"No tiedown was available when there was an RON at one of the stations," Captain Williams said. "The plane was turned into the wind and the tail was pushed up with the tailstand to compress the nose strut. Brakes were used as little as possible when taxiing because heat generated by braking action melted any snow in the drums and the brakes froze in sub-zero temperatures," he explained.

Snow landing SOP was for power on with a maximum of 30-degree flaps used in all snow deeper than six inches. Power off landings were not recommended during extreme cold since engine cylinder heads cooled off quickly. A minimum airspeed of 105 MPH over the end of the landing strip was recommended, and after touchdown the nose gear was held off as long as possible. "We didn't make any this year, but on deep snow

Sometimes the navigators worked together on a mission which crossed (bottom photo) frozen sounds and icy cliffs in the arctic.

takeoffs with C-54's we used 15 degrees of flaps and then applied power with the brakes on before starting the takeoff run. After getting airborne the nosewheel was checked by the hand steering wheel—also, the navigator checked the nosewheel through his driftsight for strut extension," said Williams.

In extreme cold another SOP included engine runups every two hours when the airlift planes were on the ground for any length of time at the northern strips. Otherwise, preheating engines and cockpits for two hours with Herman Nelson heaters was required. Lt. Col. McGovern again cited around-the-clock flying and a period of good weather as the principal reasons


in reducing the usual troubles.

Maintenance, always a rugged proposition in below-freezing weather, kept pace with the airlift. With the exception of one C-54 landing accident at Resolute Bay, only minor troubles were encountered. The accident occurred during the final part of the landing roll when the pilot of the C-54 was unable to make sufficient correction for a sudden crosswind from his left. The plane veered into a shallow snowbank by the side of the runway, shearing the nose gear. The pilot later reported that no braking action was evident.

This accident brought to a total of eight the number of USAF and RCAF crashes that have happened at Resolute Bay since October, 1947, when the airstrip was built by the U. S. Corps of Engineers. The wrecked planes were still there—occasionally being cannibalized for parts. Fire hazards of crashes are considerably reduced in the arctic due to the cold. At 30 below zero there is very little vaporization of fuel.

The fuel servicing for re-supply planes was carried out on the parking ramp at Resolute from drums conveniently located nearby. This eliminated the possibility of disturbing rust and ice in the bottom of the drums and reduced the workload.

Engine changes have been made at Resolute. A frame was used to swing the engines. Whenever possible, a windbreak was used along with ducts from two Herman Nelson heaters that directed warm air to where the men were working.

From an overall standpoint the maintenance problems brought out in flying the re-supply missions this year were minor compared with the difficulties encountered during previous airlift operations. And heat was apparently the solution to most of the minor troubles when they occurred.

In the cold of last year's heavier airlift, aircraft engine and vent lines frosted up to cause mechanical hazards. On one C-54 an oil tank burst two hours after takeoff due to pressure caused by ice and congealed oil in the vent line. A C-82A crashed on takeoff when an engine failed. Brakes froze often and various troubles were experienced with leaking hydraulic systems. Several C-54 three-engine takeoffs were made from Resolute and the planes were flown back to Goose Bay for repairs to the malfunctioning engine. This year provisions were made for better maintenance at the northern stations.

In-flight problems were about the same for this year's operations, and included the pilot's loss of depth perception when haze joined the arctic sky, horizon and earth in "whiteouts." Because of the dangers of vertigo when flying under "whiteout" conditions a right hand pattern was sometimes flown for landing approaches. While the pilot flew instruments the co-pilot peered into the whiteness and called out the turns after he had the landing strip in sight. There were usual problems in navigation and the lack of adequate radio aids to flight. The pilots also reported erratic and unreliable operation of the electrically operated flight instruments.

Briefly evaluating and analyzing some of the major problems encountered in the airlifting phases, Lt. Col. McGovern went over future requirements that were indicated from the experience gained in the re-supply operations.

"Better winterization of the aircraft used would have gone far toward eliminating, or reducing to a minimum, any maintenance difficulties," he said. "Also, our past work on re-supply in the arctic has shown a need for better equipment that would be more self-sustaining—more economical in time and manpower both on the ground and in the air; equipment and aircraft

With plenty of time logged on arctic flights the above men were typical of those working on Spring Re-supply. Left to right, they are: Captains Carroll, Burke, Osborn, Coen, Williams, and project officer, Lt. Col. McGovern. The photos at the top of the page show the RCAF canteen, C-54 engine preheating, and maintenance at Resolute Bay, NWT.

which would be more adaptable to long-range operations in the polar regions."

A few of the more immediate needs brought out by the airlift were, according to McGovern, a better internal heating system for aircraft instruments and engines; a quicker means of loading and unloading the aircraft, and more utilization of a larger capacity transport type airplane. But without these things the difficulties of operating with maximum safety in the cold of the arctic remained as a threat and calculated risk in again carrying out the Spring airlift. Captain Williams had part of the answer to better safety in the airlift in an axiom for pilots and crewmembers when he said, "There was no substitute for experience for flying in the polar regions."

Above. Captain Coen talks things over with Canadian Mountie Ed Boone. Photos at top shows crews on a mission, flight and operations at Resolute. Average turn-around time for the flights was less than an hour.

WINDCHILL AND THE ARCTIC

The severity of an arctic winter can be best described by using the term "Windchill Factor," which, explained in plain language, is the cooling effect of two variables—average wind speed and average air temperature. It is expressed in kilogram calories per square meter per hour.

Windchill is a more important factor than temperature in assessing the cooling effect of the air. A windchill factor of 950 defines the limit between the temperate and sub-arctic zones. A factor of 1450 separates the sub-arctic from the true arctic; a line indicating this factor follows, roughly, the tree-line of North America.

NAVIGATION TIPS

Capt. Maxwell E. Osborn, one of the veteran navigators assigned the 6603rd Air Base Wing at Goose Bay, who knows his compasses and a lot of technique when it comes to flying over the Arctic, had some suggestions for navigators who may fly in the region around the magnetic north pole:

- **Know and understand the grid system of navigation.**
- **Check and set gyro on grid heading of runway before takeoff.**
- **Use gyro compass for headings.**
- **Check gyro for precession every 20 minutes by means of the astro-compass.**
- **Do not reset gyro but keep precession error on precession log.**
- **Reset gyro only if altering course to another destination and check by astro upon new course.**
- **Instruct the pilot to make gentle corrections in the heading since violent correction will cause erratic precessions on the gyro in cold weather.**
- **Turn back if the flight is in weather where the sky has been obscured for more than one hour.**
- **Triple-check all computations.**
- **Take celestial observations to check all pilotage checkpoints.**
- **Send half-hour position reports.**
- **Keep radar set in operation in case of weather encounter so set will be warm and ready for immediate use.**
- **Check radar observations by celestial means and be aware that open breaks in ice appear like a coastline on the scope.**

IF THE CHUTE FITS, WEAR

MAN BY NATURE IS AN EARTH-BOUND CREATURE, but through the use of his highly developed brain and intelligence broadened over the years he has made himself triphibious, with mastery of the air, the sea and the land.

The mastery, however, is not complete when accidents cause men to lose their lives. With the loss of each life something is learned that may prevent further loss of life from the same cause. With submarine disasters came the escape lung and with the airplane came the parachute.

Many lives have been saved by parachutes, and yet emergencies occur with tragic frequency where men lose their lives simply because they do not wear theirs during flight—and here we quote from actual reports:

• • • • •

"The crew chief was ordered forward to put on his parachute and prepare to bail out. Shortly thereafter the right wing burned off and the airplane snapped to the right, throwing both of us about in the forward section. I managed to pull myself to the door through the opening. The last I saw of the crew chief, he was strapping the left leg of his parachute on."

• • • • •

"Only two men had their chutes on all during the flight and when the pilot—while he was putting on his own chute—gave them bail-out instructions, the plane went into a dive. The two men made their way back to the exit when the plane started rocking and lurching from side to side. With much difficulty on the second attempt, the door was opened and the men bailed out. The delay in putting on the chutes prior to the rocking and lurching proved fatal to the seven other members of the flight."

• • • • •

"Q. Can you tell us if the crewmembers you were able to observe had their parachutes on and their safety belts fastened?

"A. No, sir, they had not. I believe one man in the nose might have had his chute on, but I cannot be certain of it.

"Q. Do you have any recommendations?

"A. Well, sir, the only recommendation I have is to have your chute and your safety belt on at all times during flight."

When asked to give his impressions, another survivor stated:

"When I heard 'fire' over the interphone I immediately threw off my head-set, grabbed for my chest pack, and snapped it into position. I heard the alarm bell and went to my position. I was standing in my position awaiting further orders when the plane gave a terrific lurch to the right. I was standing up but I was helpless. I said to myself, 'This is it. I've had it now.' About that time the bomber exploded. I believe that momentarily I was knocked unconscious—anyway the next thing I knew, I was in free air."

• • • • •

"Three men had been flying on a cross country trip and had stopped for fuel. They let several passengers off, picked up one transient, then took off for their home base. Fifteen minutes later, the plane crashed. There were no survivors. Investigation revealed that on previous flights the crewmembers had not worn their chutes and the pilot had not required passengers to wear theirs. To numerous witnesses it seemed that there was adequate time for all occupants to bail out, unless of course parachutes were not worn by some or all of the occupants of the aircraft, or the seriousness of the situation was not evident or realized until too late for safe bailout."

• • • • •

Each crewmember must realize his own responsibilities as a part of a team that knows what to do in an emergency. One man's carelessness in complying with regulations may endanger the lives of other crewmembers who may try to aid him in an emergency.

The time lapse between normal flight and a dangerous situation can be extremely short—mid-air collision, internal explosion or sudden fire in the aircraft. When the decision is made to abandon an airplane in flight, no delay should be necessitated by having to find a parachute or to even put on a harness.

Carelessness on the part of aircraft commanders in not complying with AFR 60-5 can lead to deaths and injuries.

Occupants of Air Force aircraft will be equipped with parachutes on all flights, except as follows:

- It will be the responsibility of the theater commander to determine whether or not troops transported by aircraft into theaters of operation will use parachutes.
- Parachutes are authorized, but not required, for litter cases transported by aircraft, or for persons on helicopter flights not exceeding an altitude of 750 feet.
- In commercial types of aircraft used by the Air Force where no provision is made for use of parachutes, instructions will be issued in the technical orders covering such aircraft, prescribing the means for compliance with AFR 60-5.
- In transport type aircraft during *normal* transport operations by Military Air Transport Service.

When occupants of Air Force aircraft are required to be equipped with parachutes, the pilot in command of such aircraft will be responsible for insuring that:

- Prior to flight, a parachute is available for, assigned to, and properly fits each person making the flight. Also that each parachute is placed near the normal position of the occupant to whom it is assigned, and that its location is known to that individual.
- Occupants are thoroughly familar with the operation of the parachute equipment, and that they have complete knowledge of the operation of

IT!

emergency exits and their locations. If the pilot considers it advisable, each occupant will be assigned a particular exit in case of emergency.

During Flight—The pilot in command is responsible for having the parachutes and harness worn by all occupants during flight, as follows:

• Non-detachable parachutes at all times, except for temporary removal at the discretion of the pilot or when necessary for proper performance of duty. When the parachute is removed temporarily, it is to be kept near the occupant to whom it is assigned.

• The harness of parachutes with detachable packs at all times and complete assemblies, including packs, during such times as bailout appears imminent. When pack is not being worn, it is to be placed near the occupant to whom it is assigned.

Surely the inconvenience of wearing a chute for a few hours is worth a lifetime of happiness—ALIVE!

They WORE 'EM

As THE B-29 ROARED off the runway at March AFB and climbed to the assigned altitude on a training flight, its crew did not suspect that within an hour all would be down on the desert awaiting Air Rescue Service.

The skilled handling of the emergency which enabled 14 men to save their lives by parachute earned for Capt. Max G. Thaete of the 22nd Bomb Wing the first flight safety plaque to be awarded by March AFB.

The number three prop suddenly "ran away" at 24,500 feet. All attempts to feather were unsuccessful and a let-down was immediately started. Cabin pressure was dumped and the crew went on oxygen.

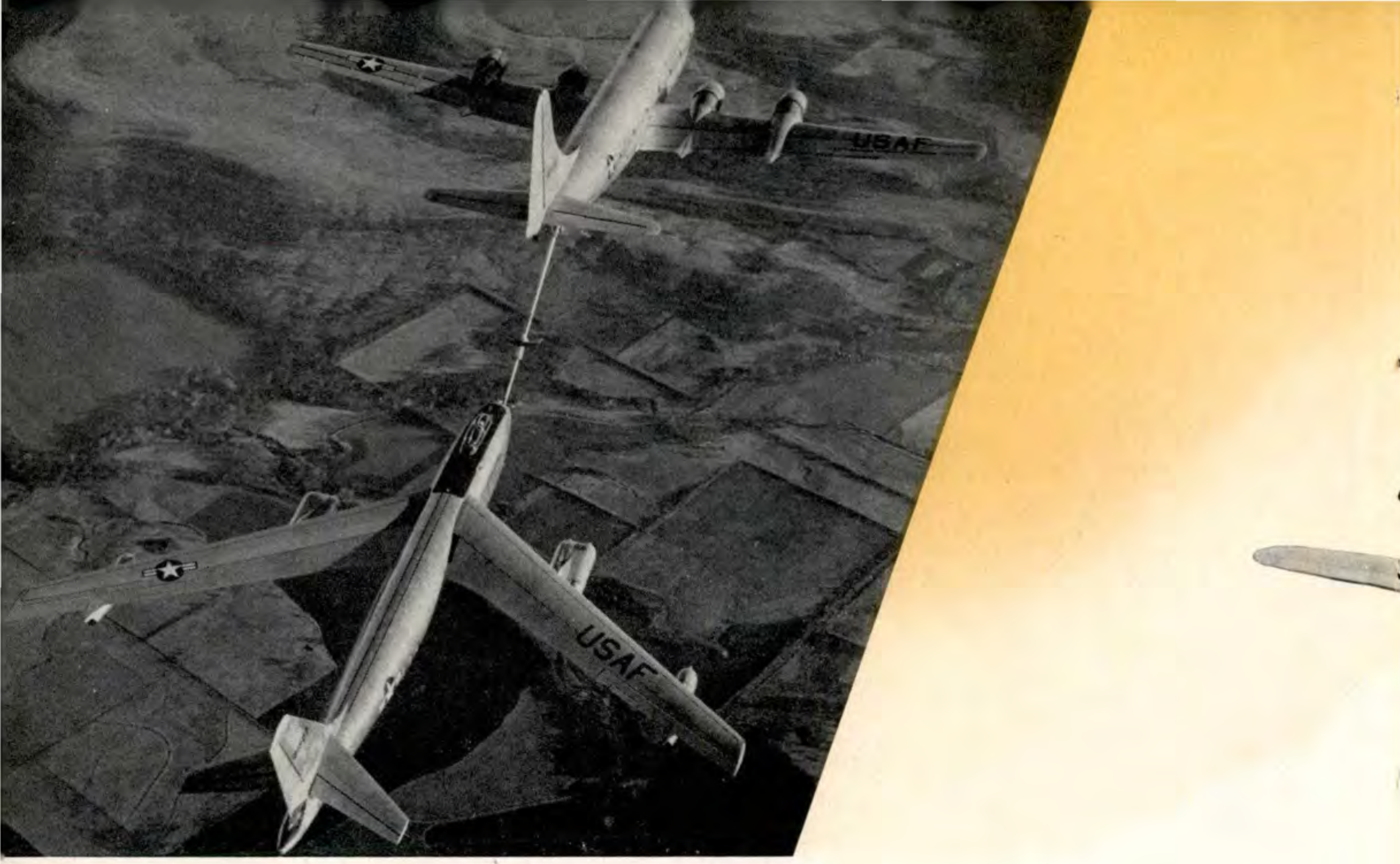
A heading was taken up that would bring them to Blythe, chosen for its runways and crash-fire equipment. About 15 miles east of Desert Center and at an altitude of approximately 10,000 feet, fire broke out in the number three engine, with flames coming from the upper cowl-flaps and extending over the wing as far aft as the scanner's window.

The bailout order was given after the fire extinguishing equipment proved futile. All 14 men landed, but not without bruises from the rough ground. Captain Thaete's attention to minute details of emergency procedures in preflight briefing gave his crew the advantage. When the emergency was declared, there was no mad scramble for parachutes. Heads were clear, as oxygen had been used down to lower altitude. And finally, all exits functioned with no jammed hatches.

This professional pilot and crew earned the plaudits of Lieut. General LeMay for a fine example of crew-teamwork.

The March AFB Flight Safety award is a monthly presentation to the officer or airman whose act or suggestion tends to preserve human life and prevent injuries; avoid loss or damage to aircraft; promote the aircraft accident prevention program. This plaque is a permanent presentation retained by the person receiving this honor. Interest in the Flight Safety program at March AFB has been stimulated to a new high, through this idea of competition for safer operation.

Col. James V. Edmundson (right) presents the first of a monthly series of Flight Safety plaques to Capt. Max G. Thaete, a B-29 Aircraft Commander of the 22d Bomb Wing, SAC. INSERT lower right—a close-up of the award suitably inscribed to the individual. It becomes his permanent possession.



"YOU'RE OVERRUNNING," warned boom operator Clancy over the VHF. "Still overrunning—move back four feet—five—six—breakaway!—breakaway!—breakaway!!!"

On hearing the "breakaway" signal, Dick followed emergency separation procedures: Closed the receiver throttles, nosed over slightly, and kicked the right rudder.

Wham! Something gave that time! Dick felt a terrific jolt as the boom came loose, but the receiver seemed to fly okay. "What gives, Clancy?"

"You pulled the nozzle off the boom!" came Clancy's quick reply.

Fortunately they were not over the water or hundreds of miles from base when this actual incident occurred. But they might have been. What was the cause and how can it be avoided in the future? Apparently the slipway door closing switch was accidentally or erroneously actuated just prior to breakaway .If the slipway door had not started to close, binding the nozzle, it is evident that the tanker and receiver would have separated without damage.

This incident just related points to the extreme importance of constant alertness by all crewmembers in handling any piece of flight equipment—no matter how good it is—and no matter whether it is just one airplane system or a whole airplane. The Boeing flying boom is no exception to this cardinal rule.

The following tips are designed to prevent this or other incidents from occurring: The better informed all crewmen are on both tanker and receiver systems, the more capably they can recognize and handle different refueling situations.

Items affecting the tanker pilot are discussed first, followed by items affecting the tanker and receiver pilots, the receiver pilot only, and the boom operator.

Tanker Pilot—Even before starting engines, the job begins with a careful inspection of the tanker for fuel and hydraulic oil leaks. This should include scrutiny of the fuel and hydraulic lines in the aft portions of the plane and the boom. It should not be implied that boom tankers are particularly susceptible in this respect; it is only that they have more than the average amount of plumbing. The boom operator and flight engineers simultaneously should be making their own preflight checks.

Once in the air, the tanker pilot's job is to make it easy for the boom operator and receiver pilot to make contact. A receiver pilot skilled in formation flying can tolerate some turning of the tanker while in contact. The tanker pilot should, however, fly straight and level unless circumstances require a slight turn, since any turning whatever makes the receiver pilot's job more difficult.

It is surprising how often it has been necessary to caution the tanker pilot not to adjust throttles when the receiver is near or in contact. He must constantly keep in mind that he is, in effect, driving a heavy truck, pulling a large trailer. It is then obvious that the tanker must not initiate any sudden turns or maneuvers. Even in gusty air the tanker pilot should avoid large, quick

REFUELING SENSE

Tips on Flying the Boom Tankers and Receivers Safely

By Marvin L. Michael, In-Flight Refueling Project Pilot and
H. C. Carson, Project Boom Operator IFR Field Training
Boeing Airplane Company

control corrections, since gusts affect tanker and receiver alike and undue "fighting the controls" makes the receiver pilot work that much harder.

The recommended technique for fuel transfer is to hold constant altitude and allow the airspeed to increase as the tanker gross weight decreases. In some cases tanker pilots have been observed to hold approximately constant airspeed, allowing the altitude to increase with decreasing gross weight. This technique should be avoided particularly for large fuel transfers to receivers which have a higher stalling speed than the tanker, such as B-45's and B-47's. Maintaining constant airspeed instead of permitting airspeed to increase during fuel transfer results in the receiver reducing its margin between flying and stalling speed as its gross weight increases. This situation is more serious for the receiver pilot because he is watching the tanker primarily and has little opportunity to monitor the airspeed indicator.

Tankers have been flown on autopilot for test evaluation during smooth-air refueling, but this practice is to be very strongly discouraged because of the dangerous situations that have arisen from inadequate or erratic autopilot functioning.

An engine failure on the tanker can be more serious than a receiver engine failure. A tanker engine failure probably would cause the receiver to overrun the tanker, resulting in a disconnect too close to the tanker for comfort; whereas, a receiver engine failure will result in a "beyond limit" extension of the boom and a more normal disconnect. The tanker pilot at all times, while in contact or preparing to establish contact, should be ready to advance throttles immediately on the good engines in case of an engine failure.

In a couple of instances due to malfunctioning, it was found impossible to retract the boom. These tankers were landed without difficulty with the boom fully extended. Should this ever occur the tanker pilot should keep in mind that the airplane center of gravity is moved slightly farther aft on an airplane which is already operating in the aft C.G. range. The principal effect of aft C.G. shift will be a decrease in static longitudinal stability, which merely means that the pilot will find it more difficult to stabilize and hold a given airspeed. Obviously, the technique for landing with the boom fully extended calls for an easy touchdown with power on, near the three-point attitude. It is also readily apparent that the fully extended boom is so flexible that any jockeying of the elevator control during the flareout will cause undesirable whipping of the nozzle end of the boom.

Tanker and Receiver Pilots—The term "breakaway" has been established and reserved for use as a code word to indicate an emergency condition. At any time when in or near the contact position, any crewmember of the tanker or receiver can call the radio signal "breakaway" if he feels the circumstances either are hazardous to the safety of the aircraft or that a malfunctioning of equipment warrants a separation of the airplanes. On the word "breakaway" every crewmember who has a manual disconnect switch immediately should operate that switch without delay or questions. The tanker pilot, in such a situation, will pull up abruptly and apply power. Misunderstood signals can cause a heap of trouble; it is absolutely essential that all communications be clear and concise.

It is obvious but most important before beginning refueling operations that tanker and receiver pilots advise crewmembers of the "No Smoking" requirements during the refueling operation in accordance with technical order instructions.

Receiver Pilot — Occasionally a receiver pilot trainee gets into a series of "S" turns as he closes in on the tanker. These "S" turns are the result of overcontrolling and tanker downwash, and until the receiver pilot trainee learns to anticipate the required control movements properly, these "S" turns are virtually uncontrollable. If this situation is ever encountered, it will be found safer and less time-consuming to throttle back, stabilize the receiver, and begin a new approach. It often helps to use rudder heavily and ailerons sparingly.

If the boom seems to be swinging much more than normally expected, it may be the result of a checkout by an enthusiastic boom operator or loss of control due to damage. Although such an occurrence is extremely rare, the receiver pilot should bear in mind that the safest procedure is to pull out to one side of the tanker until such boom oscillations have ceased. There is no known instance of damage to a receiver from parts falling from a tanker, but it is wise to keep in mind this possibility.

As in any close formation flying, the receiver pilot must keep his eyes on the tanker. Undue attention to manifold pressure, airspeed and other instruments could obviously allow the receiver airplane to collide with the tanker.

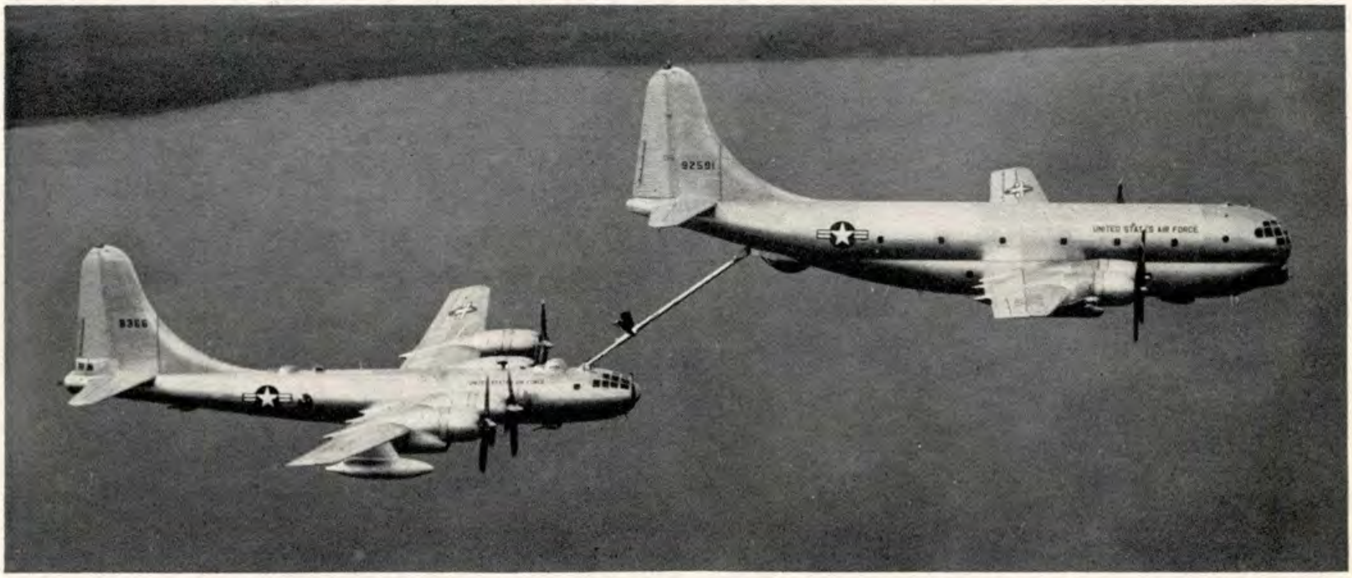
The receiver pilot ordinarily will have one hand on the throttles during contact. It is vitally important, however, that the receiver pilot be prepared at all times while flying in formation to hit his disconnect switch and chop throttles instantly in case an emergency disconnect is required. If the receiver pilot has been using only the outboard throttles, as will be the case with the B-50 receiver, it is important that not just the outboards but all four throttles be chopped in case of an actual emergency.

While closing in for contact, receiver pilot trainees on some occasions have flown formation on the boom rather than on the tanker. In case of interplane radio communication failure, this situation could become hazardous. If the boom operator perceives that the receiver pilot is getting too high, he will raise the boom to keep it clear of the receiver. If the receiver pilot continues to fly formation on the boom, he will fly still higher to follow this upward movement of the boom. It is readily apparent that the receiver pilot would thus get into a hazardous position by getting too close to the tanker.

In case of hydraulic or electrical failure, the signal system may cause the tanker to go to "disconnect" while the receiver stays in "contact made." The tanker then pulls in the receiver with a 1,500-pound force (more or less) as the boom retracts. In this case the retraction limit switch on the tanker will not free the receiver from the tanker; the receiver pilot's disconnect switch must be actuated to free the nozzle from the receptacle. For this remote possibility and for other unforeseeable emergencies which might arise, the receiver pilot must be prepared to hit his disconnect switch.

For all disconnects (any cause) the receiver pilot will hit his disconnect switch simultaneously with the boom operator as a precautionary

The tanker pilot must constantly keep in mind that he is, in effect, driving a heavy truck pulling a large trailer — no sudden turns.



measure and as a crew training measure for emergencies. No harm is done in this supplementary switch actuation, and it may avert damage to equipment in the event of some unexpected malfunction.

In case of malfunctioning of the in-flight refueling equipment it may be possible to refuel using the emergency procedures. Since the emergency procedures require manual operation, careful coordination is mandatory and the procedures should not be attempted in very rough air. It is highly desirable, however, that flight crews should practice these procedures under ideal smooth air conditions initially in order to be prepared for a possible emergency under less favorable circumstances.

Boom Operator — Probably the best way for the boom operator to be sure of doing his vital job safely is just to follow the normal operating procedures meticulously.

Prior to takeoff the boom operator must check the entire system for proper installation, inspect all lines, pumps, valves and signal amplifier, etc., for improper installation or leaks. Following the visual inspection, he should functionally check the boom for proper operation. When all of these checks are satisfactorily completed, the boom operator reports the results to the tanker pilot. Then he is required to pressure check the boom and refueling lines at 100 pounds pressure to determine that the boom and associated equipment are satisfactory for refueling operations.

After takeoff, the boom operator must execute the "After Takeoff" boom check which includes all the envelope limits in addition to the limits previously checked on the preflight check. When this check has been satisfactorily completed, the boom operator is assured of a properly functioning boom system.

When the two airplanes have completed the initial stages of formation, the boom operator should determine the following items:

- Receiver slipway doors open and turret stowed 90° to either side (B-50D Receivers).
- Establish the pumping schedule desired with the tanker engineer. (Air conditions and receiver requirements make various pumping schedules desirable.)
- Receiver and tanker signal systems in "Ready for Contact." (Attempts to establish contact with the receiver in "Contact Made" could result in damage to the nozzle and prevent further fuel transfer on that flight.)

When the above items are checked the boom operator can direct the receiver into the contact position, establish contact, and monitor the transfer. It is the boom operator's responsibility to

- Prevent the boom from striking the receiver at any point other than the slipway area.
- Give directions when required to aid the receiver pilot.
- Elevate the boom and clear the receiver airplane as soon after a disconnect as is practical.

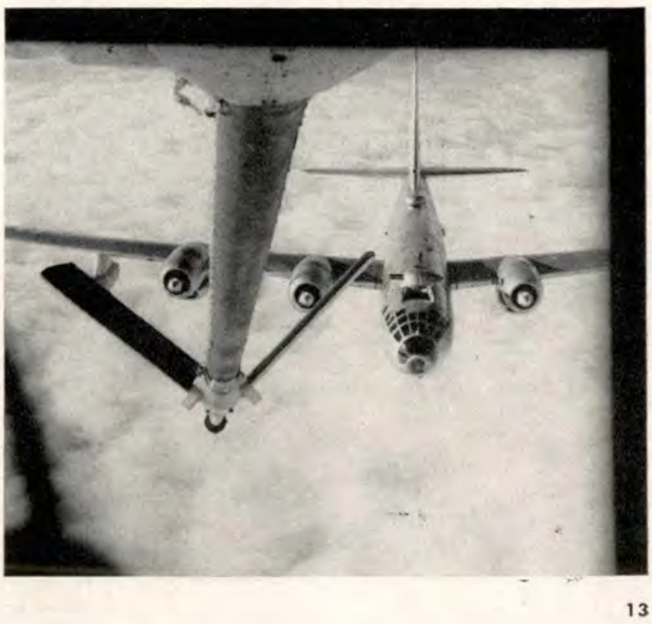
If a boom malfunction is suspected, the boom operator should get the receiver clear of the tanker and check further before resuming operations. If a receiver pilot should fail to understand or to follow a boom operator's instructions to move out of the contact envelope, the boom operator may elect to stow the boom and return to base for checking prior to additional contacts. Actually—and we cannot overemphasize this—the relationship between the boom operator and the pilot of the receiver airplane, for this portion of the operation, is comparable to that of the GCA controller and the pilot on an instrument approach; the receiver pilot during this time must rely upon the judgment and decisions of the boom operator.

Following the disconnect, the boom operator shall check the receiver slipway to determine that there is no fire, and the slipway is clear and the static line retracted. When these have been done and the transfer is completed, the boom operator will stow the boom and purge it free of fuel, shut down his equipment and prepare for landing.

His responsibilities do not stop when the transfer is complete. After the landing, he must check his equipment and grease the boom. When the "After Landing" check is complete, he is assured that his IFR equipment is safe and secure for future flights.

Refueling contact as seen from position of the boom operator.

Receiver pilots must fly formation on the tanker, not the boom.



HOT AIR IS *Thin*

ONE OF THE problems of military flying today which vitally affects the performance, utility and efficiency of the USAF is the simple takeoff.

The trend in the past has been toward a continual increase in the length of runways to insure getting off the ground, but contrary to popular opinion, runway extension in itself does not necessarily provide a solution to the takeoff problem.

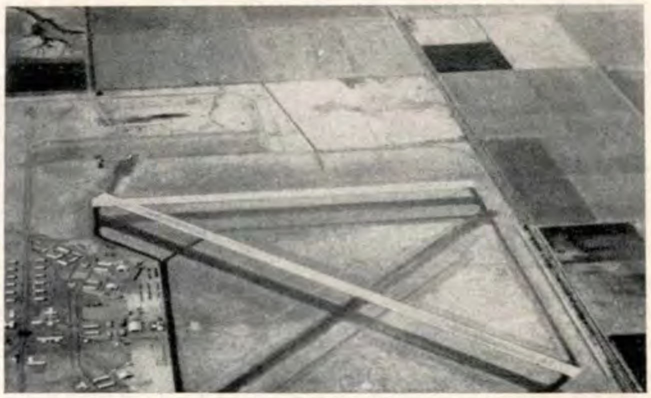
Increased runway lengths have been necessitated by the constant effort to attain maximum possible speed, range and payload of new military airplanes. Also, to get more range and payload, the gross weights of existing aircraft have been increased with a comparable requirement for longer runways.

Complications to the problem are the wide variation of characteristics of individual airplanes, different types of missions, variations of temperature and field elevation and the advent of the jet power plant.

Because the thrust of a turbojet engine is directly related to air density, it is essential that both temperature and elevation of the field be considered in the takeoff.

From a study of airfields, both domestic and abroad, it has been found that the majority are at elevations under 1,500 feet. Thus, it is evident that temperature is the most common factor in affecting the air density at most airfields.

It is well to keep in mind that takeoff distances can vary greatly even though the pilot, aircraft and gross weight remain the same. It is dangerous to become a "creature of habit" on takeoffs. A pilot who is used to becoming airborne after a certain length of time or distance may be inclined to abort his takeoff from a field that is far above sea level if he does not become airborne after the usual length of time or distance. This could result in a serious crash, or at least do damage to the aircraft from blown tires, nose-up at the end of the runway, or a groundloop.

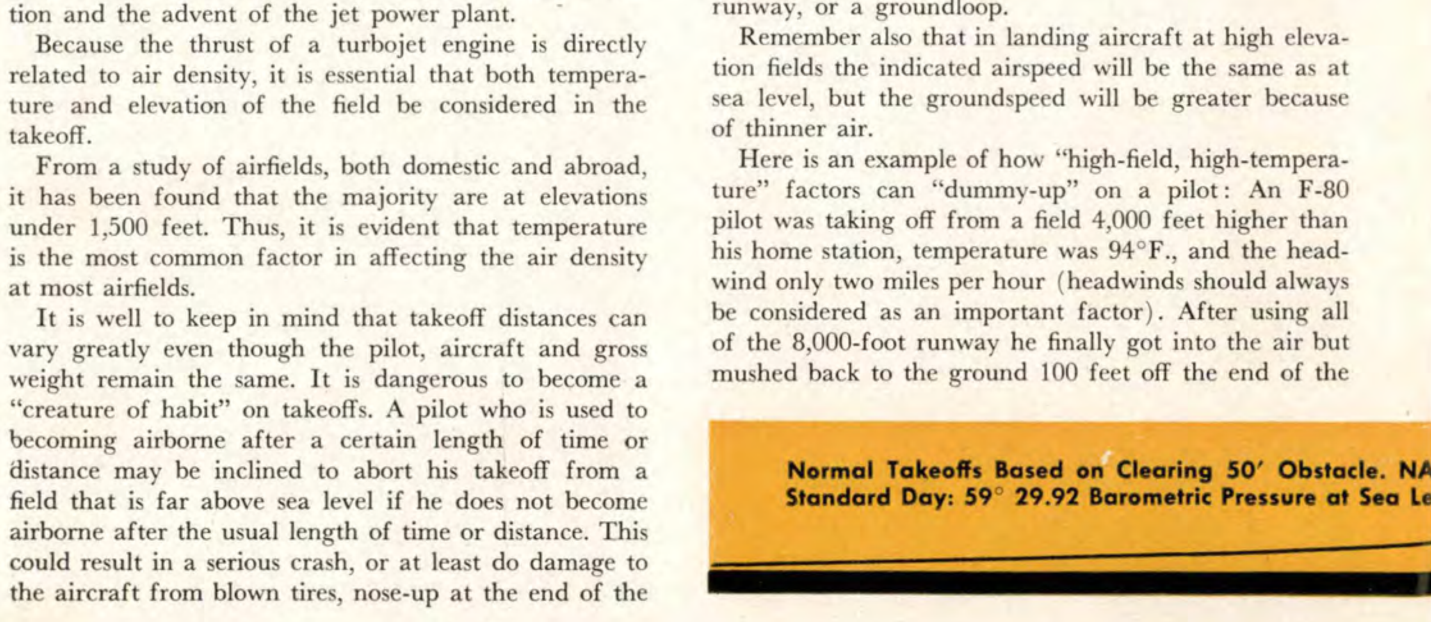


In this un-retouched photo, runways of a desert airfield 43 feet below sea level appear elevated. While this is an optical illusion, high temperatures do have the same effect as elevating runways.

Remember also that in landing aircraft at high elevation fields the indicated airspeed will be the same as at sea level, but the groundspeed will be greater because of thinner air.

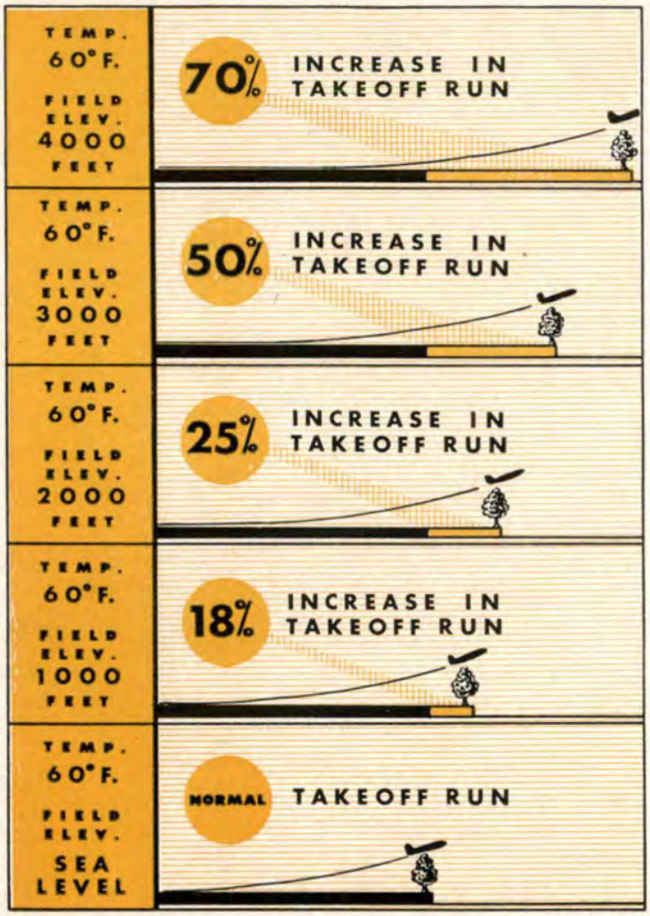
Here is an example of how "high-field, high-temperature" factors can "dummy-up" on a pilot: An F-80 pilot was taking off from a field 4,000 feet higher than his home station, temperature was 94°F., and the headwind only two miles per hour (headwinds should always be considered as an important factor). After using all of the 8,000-foot runway he finally got into the air but mushed back to the ground 100 feet off the end of the

Normal Takeoffs Based on Clearing 50′ Obstacle. NA
Standard Day: 59° 29.92 Barometric Pressure at Sea Le



Air

THE INCREASE IN REQUIRED TAKEOFF DISTANCES COMMONLY ASSOCIATED WITH HOT WEATHER OEPRATION OF ANY AIRPLANE IS EVEN GREATER WHEN THE AIRPLANE IS JET-PROPELLED



runway. He bounced back in the air and continued flying at an indicated airspeed of 150 miles per hour. Then he encountered a gradual rise in terrain and cut through a power line on top of a hill. Luckily he got back to the field safely, after learning the hard way.

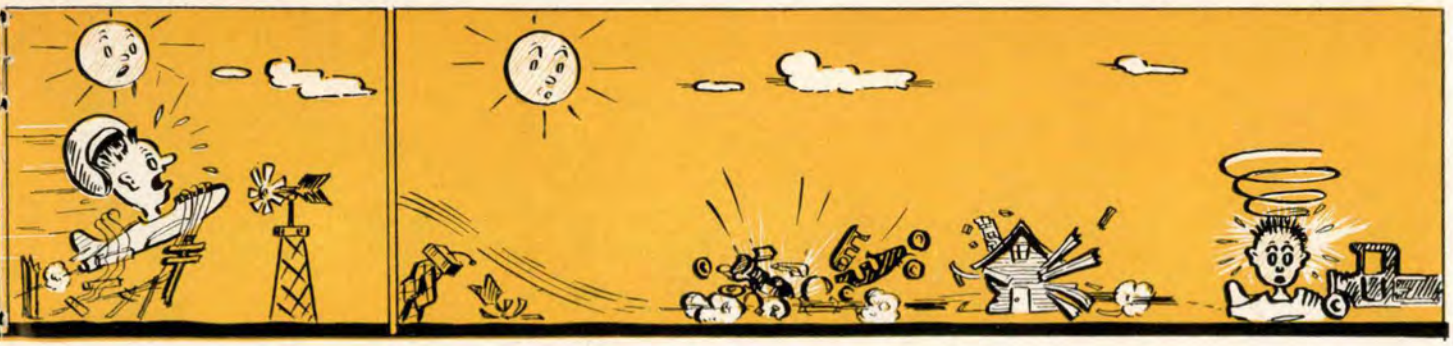
If you have a high field combined with high temperature you had better double check the takeoff factors of your airplane.

Ordinarily a field of 1,800 feet elevation at a temperature of 60°F. wouldn't pose much of a problem, but in addition to the improper use of flaps it was a lot more than one pilot could handle. After using nearly all of a 5,400-foot runway, he pulled the nose up, mushed along for over 500 feet and struck a fence, breaking a post and several strands of barbed wire. A moment later, 1,195 feet later to be exact, the airplane went through a large number of telephone wires—breaking them all. Next it struck and broke off a power pole, worked its way through a windmill atop a steel tower and knocked the windmill off the tower. At a gradual rate of descent it struck the ground, continued sliding forward through two parked cars, went completely through a frame house and came to rest a few feet from a truck. The truck caught fire and burned. This is illustrated at bottom of page.

To know how high elevations and high temperatures affect takeoffs and landings under various loads and configuration, consult the Technical Order for the airplane you fly.

An indication of the relationship of temperatures and elevations, the following combinations of temperatures and altitudes represent the same density:

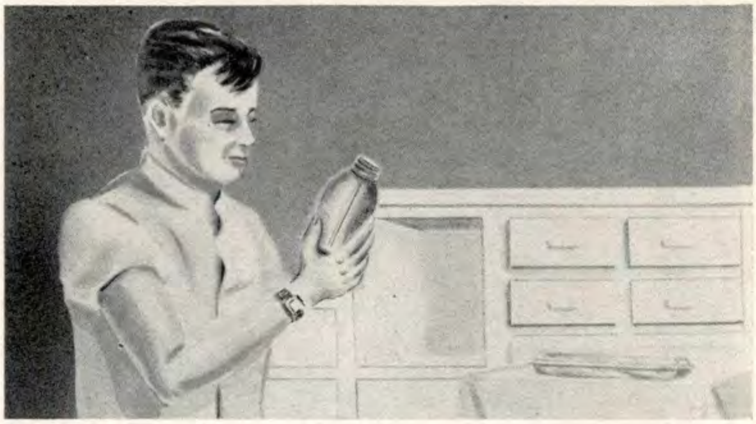
100°F. (38°C.) at sea level is equivalent to:
80°F. (27°C.) at 1,000 feet above sea level,
60°F. (16°C.) at 2,000 feet above sea level,
42°F. (6°C.) at 3,000 feet above sea level, and,
25°F. (–4°C.) at 4,000 feet above sea level.



CRASH ALA

By A. Wayne Baker
Hill AFB, Ogden, Utah

When Sirens Wail as Ambulances Roll
The Emergency Ward is Alert and Ready



THE SPECIAL TELEPHONE on the desk rang sharply for an instant before the sergeant picked up the receiver. There was no need for his usual, "Base surgeon's office, Sergeant Erickson speaking." Erickson jumped into action as he heard:

"Crash on runway one-six. Crash on runway one-six. Baker two five. Crash on runway one-six. Crash on . . ."

He had heard enough. He called the flight surgeon, just in case the major had not already been notified. "Better hurry right over, Major. We've had a crash and the ambulances should be on their way back."

Immediately the hospital staff was in the process of getting everything ready for the arrival of the ambulances. Everyone knew his job and was getting it done. Most activity was centered in the crash ward.

Gleaming surgical tools were laid out systematically, sterilizers turned on, oxygen outlets tested. One of the neatly uniformed nurses looked up from her job of checking an oxygen mask just in time to see Sergeant Erickson hurry through the doorway.

"How bad is it, Sergeant?" she asked.

"Don't know yet. But better have everything ready."

"We're ready to go right now."

And just like a well rehearsed play where everything falls into place at the right minute, the flight surgeon walked into the room as the sirens announced arrival of the ambulances.

"Everything is ready, sir," Erickson reported.

The major surveyed the room with a critical but approving eye. It looked pretty good. No lives would be lost here for lack of equipment or trained personnel.

"You've done a good job. You can put the stuff away now," the Major said. "This was another test."

The doctors, nurses and attendants who had been standing by and those who had arrived in the ambulances, smiled, walked out of the crash room and returned to their routine. They had completed a lot of these test runs. They too were sure that if and when their skills were needed they would know what to do and would do it in a hurry.

Throughout the world, at major Air Force bases, there are crash wards similar in concept to the one provided by Hill AFB Hospital. These wards are not a particularly new idea. During World War II many flight surgeons and hospital commanders realized the need for a special stand-by medical facility to provide specific care for aircraft crash victims. There were a number of such activities organized by local initiative and called "Burn Rooms," "Shock Wards," or by other names to set them off as emergency facilities. However, there was no widespread, officially-directed program for these activities.

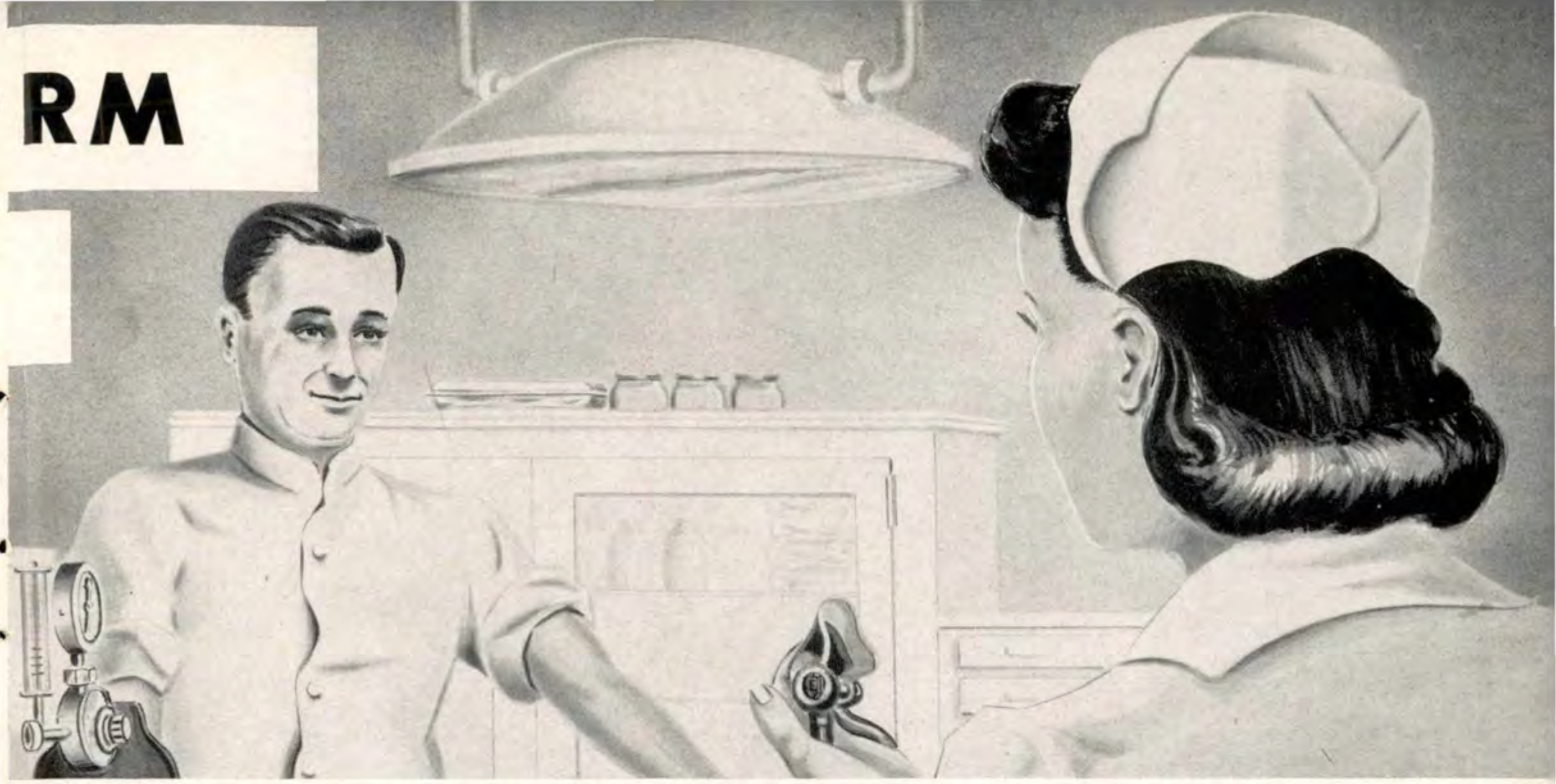
During the post-war period, many of our air bases were closed, and flying activities suspended. At many of our permanent Air Force bases, the crash ward type activities were maintained as continuing insurance, and several further refinements and developments increased their effectiveness. At Bolling Air Force base, for example, there was developed a mobile surgical cart which carried right to the bedsides all necessary dressings and supplies with medications and instruments. These allowed several doctor-nurse teams to operate simultaneously. The carts are standard equipment in the crash wards now organized under a definite Air Force program.

As with any kind of insurance, the crash ward exists —just in case—and always with the hope that it will not be required. The very idea of having a room or ward, with perhaps 20 or more beds, fully equipped and standing idle is repugnant to an efficient hospital administration. But it does pay off, such as at Bolling AFB when in late 1949 the emergency crash ward provided the "on-the-spot" service credited with saving 18 lives from an air line crash in the nearby Potomac River.

Each individual base hospital has its own different

Maj. Henry F. Steinbock, Flight Surgeon at Hill AFB, calls control tower to request practice crash alert for hospital staff.

RM



facilities and problems, and each crash ward is tailored to the space available and the type of flying activity. For instance, a large bomber base or a busy transport terminal can expect larger space requirements in an emergency than a fighter base or training activity. The effectiveness and completeness of each crash ward is a reflection of the ingenuity, devotion and teamwork of the medical personnel who man it. The team at Hill AFB Hospital had been working together in the crash ward since early in 1950. By May, the ward began to grow and take shape.

Now the ward has a private entrance. Complete surgical equipment is always instantly available—and so is all the specialized equipment devised by science to treat airplane crash victims. Capt. Janice Blount, AFNC, and Capt. George Barger, medical group adjutant, have done most of the work in setting up the ward.

The unexpected test runs instigated by Major Henry Steinbock, the base flight surgeon, are really paying off in efficiency. The time it takes to get everything ready has been reduced considerably since the first run was made a year ago.

In these days of large capacity aircraft, medical personnel foresee the possible need for more beds, surgical facilities and skilled hands. Therefore, advance preparations by the hospital staff have not been limited to just the Hill crash ward.

A complete plan and working agreement for emergency treatment of crash victims has been developed by Major Steinbock and officials from the large hospitals in Salt Lake City and Ogden, Utah. If disaster strikes, the Hill crash ward will function at capacity—the overflow being sent to nearby hospitals for treatment.

So far, the crash ward has never been used — and that's the way the hospital staff wants to keep it, ready and unused . . . there . . . just in case.

Surgical technicians, Pfc Bargo, left, and Priest, right, check specialized hospital equipment to make sure everything is ready.

Traction beds are set up ready for use in the crash ward. Right, Surgeon Curtis and Nurse Updegrove treat patient for shock.

WATER IS LIFE

You don't have to be a weather-beaten "Desert Rat" to lick the earth's arid wastelands . . .

A SURVIVAL EXPERT once said, "The Arabs don't know much about survival in the desert. Of course not! They just live there!" You can live there too if you rid yourself of the fear and superstitions you may have picked up from desert adventure tales and really learn a few authentic facts of desert life.

These vast desert expanses cover nearly one-fifth of the earth's surface, yet hold only four per cent of the world's population. These areas are identified with extremes—extreme heat, extreme cold, extremely little vegetation and animal life and most important in any desert is the fact that it is an extremely long time between drinks unless you carry your water with you.

Although the flying you may be doing at the present time may confine you to a limited radius such as a check pilot at Great Falls, Montana, or as a student pilot in the Mississippi Delta Area, this will not always be your situation and don't kid yourself into thinking that this desert survival technique doesn't apply to our continental United States. There are some very long and arid stretches of desert terrain here in our Southwest.

Granted, your chances for a quick rescue or short hike to a road are very good in our USA, compared to a bailout or forced landing in the Sahara or the Arabian deserts. But you should not take chances.

Water is the priceless item and the key to desert survival. An Arabian proverb states: "Three things there are that ease the heart from sorrow: water, green grass and the beauty of women." Here in this article we will expand on the first item, touch briefly on the second and forget the last unless you brought along your own, for religion and women are taboo items in our relations with desert dwellers.

The normal body temperature for man is 98.6°F. Any variation, even as little as one or two degrees from that normal temperature, reduces one's efficiency. Increases of six or eight degrees above normal for any extended period causes death. During sickness this is usually in the form of fever but the body temperature of a healthy person also can be raised to the danger point either by absorbing heat or by generating heat too fast. The body absorbs heat from the air if the air temperature is above 92°F. It can get heat from direct sunlight, radiant heat, even if the air is relatively cool. Also any kind of work or exercise produces body heat.

Regardless of where it is obtained, the body must get rid of this excess heat and keep body temperature as close to the normal 98.6°F. as possible. This is accomplished by the evaporation of perspiration on the skin surface. However, when you sweat, your body loses water. This is referred to as dehydration. It is true that the body is two-thirds water, but *every bit of body water is needed for normal functioning.* Thus, when you lose body water by sweating, as you dehydrate, that loss must be replaced by drinking water or the body pays for this loss in reduced efficiency.

The danger months are now here that make our Southwest territory a formidable place to be walking through. The months of June, July, August and September are most critical because of high temperature during the sunshine hours. This accelerates dehydration to the point where a low supply of water could be a matter of life or death.

Dehydrating up to 10 per cent of a man's weight leaves no permanent harm if enough water is consumed to gain it back later. Efficiency lost by dehydration is quickly restored by drinking water. Replacing this lost perspiration will, in a few minutes, restore a man who has collapsed from dehydration.

During experiments of from six per cent to 10 per cent dehydration, the symptoms follow in this order: dizziness, headache, difficulty in breathing, tingling in arms and legs, and a dry mouth. Your body gets bluish, your speech is indistinct and finally you can't walk. From this stage on, you need help.

It is quite probable that man can survive 25 per cent dehydration in air temperature of 85°F. or cooler. At temperatures up in the 90's and higher, 15 per cent dehydration would probably prove fatal in most cases.

There is no substitute for water. Contrary to fiction of the desert—weird tales of the use of alcohol, salt water, gasoline, blood or urine to counteract dehydration has proven to *increase* it. The reason is simple: all contain waste products which the body must dispose of through the kidneys and, to accomplish this, more water than is contained in these liquids is required to carry off these wastes through the body.

An important point. Ration your sweat and not your water supply. The water you drink when exposed to desert heat is not wasted. Carry your water in your belly—drink as you feel thirsty and keep your efficiency. Men have dehydrated with water still in their canteens—and wondered why they couldn't walk or work! It is the water in your body that saves your life, not the water in your canteen.

Your body produces so much heat every hour while at rest that unless that heat were lost you would have two degrees of fever in one hour. Evaporating sweat takes care of that heat just as fast as it is formed.

In hot deserts you need about a gallon of water per day. If you follow the rules and walk in the "cool" desert night, you can get about 20 miles for that daily gallon. If you do your walking in daytime heat, you'll be lucky to get ten miles to the gallon. Whether you sit out your desert survival or walk home to mother, you need water, at least three to four quarts per day.

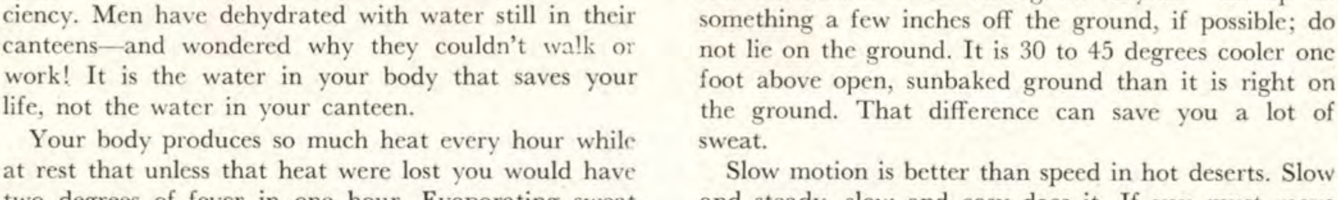
Drink your water as you need it but keep excess heat out of your body. That can be done if you keep your shirt on. It had better be a white or light colored shirt. Clothing helps ration your sweat by not letting it evaporate so fast that you get only part of its cooling effect. Light clothing also reflects or turns away the heat of the sun and keeps out the hot desert air. You may *feel* more comfortable in the desert without a shirt or pants. That is because your sweat exaporates so fast. But it takes more sweat, and sunburn is a painful trouble. Desert sun will burn even if you have a good coat of tan, so use your head, maintain your efficiency, and keep your clothes on.

Keep in the shade as much as possible during the day. Desert natives have tents open on all sides to allow free circulation of air during the daytime. Sit up on something a few inches off the ground, if possible; do not lie on the ground. It is 30 to 45 degrees cooler one foot above open, sunbaked ground than it is right on the ground. That difference can save you a lot of sweat.

Slow motion is better than speed in hot deserts. Slow and steady, slow and easy does it. If you must move about in the heat, you'll last longer on less water if you take it easy. Remember the Arab. He isn't lazy; he's just living in slow motion, the way the desert makes him live.

If you have plenty of water, two or three gallons per day, go ahead and work your head off if you want to and drink as often as you like. In fact, you had better drink more and oftener than you think your thirst requires if you want to stay healthy and keep efficient.

The chart below shows days of expected survival in the desert. Note that survival time is not appreciably increased until available water is about four quarts, the amount necessary to maintain water balance for one day at high temperatures. Using shade or otherwise reducing temperature a few degrees is as effective and as important in increasing survival time as water. At equal temperatures the body requires two to three times as much water in deserts as it does in jungles or in humidified buildings.



MAX. DAILY SHADE TEMP. OF °F	NO WATER	1 QUART	2 QUARTS	4 QUARTS	10 QUARTS	20 QUARTS
120°	* 2 DAYS	2 DAYS	2 DAYS	2.5 DAYS	3 DAYS	4.5 DAYS
	** 1 DAY	2 DAYS	2 DAYS	2.5 DAYS	3 DAYS	
110°	3 DAYS	3 DAYS	3.5 DAYS	4 DAYS	5 DAYS	7 DAYS
	2 DAYS	2 DAYS	2.5 DAYS	3 DAYS	3.5 DAYS	
100°	5 DAYS	5.5 DAYS	6 DAYS	7 DAYS	9.5 DAYS	13.5 DAYS
	3 DAYS	3.5 DAYS	3.5 DAYS	4.5 DAYS	5.5 DAYS	
90°	7 DAYS	8 DAYS	9 DAYS	10.5 DAYS	15 DAYS	23 DAYS
	5 DAYS	5.5 DAYS	5.5 DAYS	6.5 DAYS	8 DAYS	

*No exercise and remaining quiet.

**Walking at night until exhausted and resting thereafter.

After all this discussion of the dire need of water to retain life on the desert, mention should be made as to how to find it in desert areas. With the thought in mind that quick rescue might be S.O.P. on the airways of our continental United States, emphasis will be placed on the sandy soils of northern Africa and Arabia.

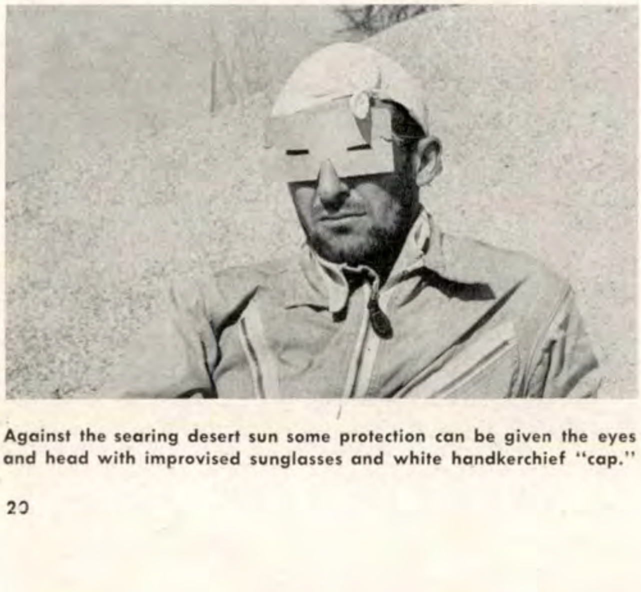
Desert oases are proof of the fact that where there is water, there is life. In all deserts, wells are the source of most water. Hand dug wells have furnished water to irrigate eastern Sahara oases for centuries. The methods of hauling water to the surface are varied. Hand dug wells are located in low places of the desert. Basins, dry river valleys and hollows in the dunes are typical geographic locations. The best of these are the ancient river beds.

There are shallow lakes in most deserts but because the water that reaches them flows through salt-bearing soil, these are salt water lakes. Some of the salt water tastes like table salt. In other areas it may contain magnesium or alkali. If not too strong, such waters are drinkable even though they may have a laxative effect.

One sometimes hears stories about poisoned wells. Many of these are based on bad-tasting water just mentioned and are not poison. Actually the danger of poison from water in Sahara can only be cited as a curiosity for there are just two wells in this class. One is at Tini-Hara in Esh-Shish Erg. It is so strong of chlorine that it will burn clothing. In the same Erg, General Laperine found another well so strong of saltpeter that it caused vomiting.

In the Sahara deep hollows on rocky plains act as cistern and collect surface water from the rare torrential rains. These tanks may be dry for 10 or 15 years, then suddenly be deep enough for a good swimming hole. The water in them is fresh and drinkable and may take several weeks or months to dry up. Unfortunately, there is no way for the casual traveler or stranger to the area to know of the existence of such water holes and there is no rule to guide one to them. They are natural drainage basins like depressions on a plain or plateau. If your observations tell you there has been a rain recently in your area, then keep an eye out for such hollows or any protected cavity which would naturally collect surface drainage.

Once natives have been contacted in any desert, food and water are available. In normal times desert people are hospitable. Native food in Sahara is both palatable and edible. The meat offered you may be goat or mutton or chicken. In rare cases it may be camel. Steamed



Against the searing desert sun some protection can be given the eyes and head with improvised sunglasses and white handkerchief "cap."

wheat flour pellets which look like a great platter of rice is "cous-cous" and really good eating. The vegetables which go with it you will recognize.

Deserts are quite healthy places. Dry air is not favorable to bacteria. Wounds usually heal rapidly in the desert even without treatment. Except in some parts of Sahara, malaria does not exist.

Leaving the physiology of man on the desert, the following survival tips are well to know:

U. S. SOUTHWEST—

*• Have plenty of water aboard the aircraft for use in flight and following a crash landing. Have enough aboard to drink all you want while flying over the desert so you don't have to land already thirsty. If you bail out and have sufficient time, try to spot a highway, habitation or water source while you still have altitude to see around a reasonable distance.

• Fly airways and give position reports. Give emergency position if time permits.

• Stay near aircraft. Spread parachute canopy to attract attention.

• Set up signaling devices (brush and oil for smoke —flares if available—mirror, etc.). Distances on deserts are misleading. You may start out for a green, cool mountain and never get there, because it may appear to be right at hand but actually be 100 barren miles away.

*• Keep out of the hot sun. Ration your sweat, not your drinking water.

*• Keep your shirt on. Avoid sunburn. You can make a burnoose or protective robe from your parachute.

*• Wear a good solid pair of GI Hi-top shoes (that will not be snapped off in a bail-out).

*• Protect eyes from glare.

*• Don't go chasing mirages—they look real and can be photographed but the scene reflected is far beyond the horizon.

SAHARA AND ARABIAN DESERTS—

• Travel along established caravan trails.

• Always have maps of flight areas. Know your position at all times.

• Be friendly with the native travelers and they will help you.

SAHARA TIPS—

• Have rope (at least 100 feet) from parachute shroud lines and utensils for obtaining water from deep wells and containers for carrying (if possible).

*• Conserve energy—work or walk after sundown.

In all deserts, except in unfriendly countries, your best chance of rescue is to stay with your airplane, unless you know definitely that help will be available after a short stroll and you have enough water to complete it.

As a parting bit of advice, plan for your desert survival **now,** before your next takeoff for a desert flight.

*Applies to all desert areas.

Pararescue team jumps from C-47 in a practice rescue mission.


Lack of water is the greatest obstacle to walking in the desert. Day travel requires two or three times the water needed at night.

Flight Safety: *Circa* 1496

So you think that Mae Wests, parachutes and retractable landing gear are products of our aviation age! Here's a man who discovered flight safety about the time Columbus discovered America.

". . . THEN, IN SAFETY, take a calm flight, which will always be entirely free."

So speaks, from the pages of history, with words which hold a warning and a promise, the world's first flying safety advocate, Leonardo da Vinci.

Painter, sculptor, architect, scientist, designer of the forerunner of the modern helicopter and propeller, he expressed, in the 15th Century a concept of perfect flight toward which men of the 20th Century are still striving . . . flying safety . . . calm flight . . . freedom of mind. To his logical mind, one followed the other as the night follows the day.

Leonardo designed "flying machines" fully aware that flight for man involved the chance of accident, due to material failure and man's limitations. As a designer he says, "One may guard against the danger of destruction caused by the breaking of the machine by making it as strong as possible in whatever line it may turn."

The evolution of the airplane since his experiments in the 15th Century would not amaze this man who only failed to fly for lack of motive power. Neither would man's consistent quailties of carelessness and resistance to knowledge cause him much surprise. Apparently we have only managed to retain through the centuries those same qualities which caused the inventor to turn from his machines and contemplate man's potential as a destroyer of the wings which bore him.

After considering man in this new element, he set down detailed instructions that could well have served as the basis of our modern flight training manuals and safe flying programs.

"The bird (flying machine) which I have described ought to be able, by the help of the wind, to rise to a great height and this will prove to be its safety. The movement of the bird ought always to be above the clouds so that the wing may not be wetted, and in order to survey more country and to escape the danger caused by the revolutions of the winds among the mountain defiles which are always full of gusts and eddies of winds. And if moreover the bird should be overturned you will have plenty of time to turn it back again following the instructions I have given you, before it falls down again to the ground."

Then, foreseeing the "off-chance," he went on to provide safety equipment. He offered, if not the first Mae West, at least an interesting prototype. "This machine should be tried over a lake, and you should carry a long wineskin as a girdle so that in case you fall you will not be drowned."

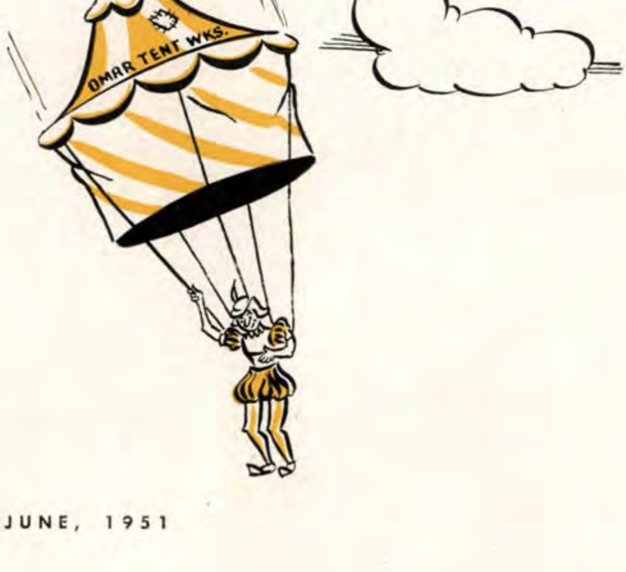
He also anticipated the probable necessity of bailout: "If a man have a tent made of linen of which the apertures have all been stopped up, he will be able to throw himself down from any great height without sustaining any injury."

In his first designs the wings of his flying machines were copied exactly from the birds and bats. Perhaps this is why in his writings he almost always refers to his machine as "the bird" and why he considered his flying machine and the human in it as one . . . mutually interdependent for safe operation. Later, he abandoned the flapping wing in favor of rotating wings and in his search for motive power, invented the propeller.

"I find that if this instrument be well made . . . and be turned swiftly, the said screw makes its spiral in the air and it will rise high."

While flying his model helicopters, Leonardo observed the damage done to the "instrument" when it made contact with the ground. As a result, he devised the first retractable landing gear which, being two ladders, served the added purpose of enabling the pilot to climb into the machine!

"When the foot of the ladder touches the ground it cannot give a blow to cause injury to the instrument because it is a cone which buries itself and does not find any obstacle at its point . . . these hooks that are underneath the feet of the ladder act in the same way as when one jumps on the points of one's toes for then

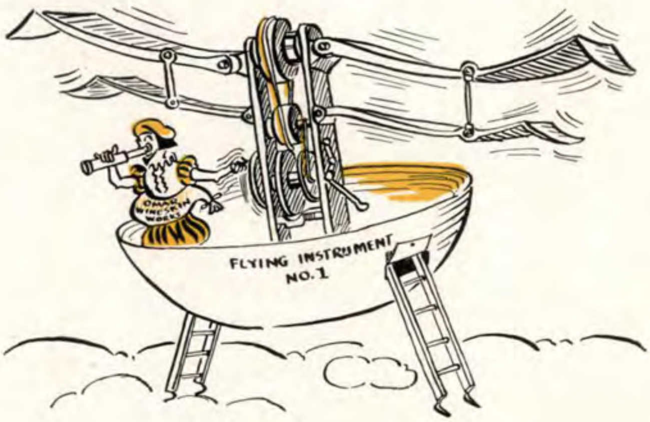


one is not stunned as is the person who jumps upon his heels. When you have raised yourself, draw up the ladders as I show."

These ladders were installed on his man-carrying machine which had wings 96 feet in diameter and in which the pilot was in an upright position. "The habit of long custom requires this position."

Always alert for improvement in design, he turned his attention to safety factors for the control system. "In construction of wings one should make one cord to bear the strain and a looser one in the same position so that if one breaks under the strain, the other is in a position to serve the same function."

He was concerned about the flight charactertistics of his flapping wing and its control system: "The cord A set for the purpose of extending the wing ought to be of thick dressed hide, so that if the bird should be turned upside down it may be able to subdue the fury of the wind which strikes it on the wing and seeks to close it, for this would be the cause of the destruction of the bird. But to make it more safe you should make



exactly the same system of cords outside as within and you will then avoid all suspicion of danger."

Leonardo's knowledge of flight technique and safe flying practice evolved entirely from his study of birds and from his ability to visualize in detail the problems of flight. His notes include observations which sum up the four fundamentals of flight on whose foundation all safe flying habits are still constructed. He foresaw the utility of the airplane for travel and drew what is probably the first airman's chart of the Iberian Peninsula. The hazards of weather and wind caused him much concern and especially the chance of overturning. Plenty of altitude was always his answer to this.

Conditions which he expected his "bird" would encounter in flight led him to leave these notes which so closely parallel current SOP's, and which could, with some change of wording, appear under familiar heading in our basic flight manuals. In his observations on flight technique can be found descriptions of factors which are today recognized as the basis of common accidents.

The following excerpts bring to the mind of any pilot the voice of his first instructor:

Pick a Field and Stick To It—Leonardo said: "The descent of birds is of two kinds, of which one is with certainty upon a fixed position, the other is uncertain upon two positions or more."

Set Up the Glide—". . . and at whatever angle the bird sets itself, in the same angle its descent will be."

The Spiral, or Keep Them Level—"If one of the wings drop more than the other the straight movement will be changed to a curve and it will circle downwards around a spot below to which the lower wing is pointing."

Cross-wind Landing—"If the bird were to raise its wing above the wind on the side on which it is struck by the wind, this bird would be turned upside down."

Keep It Straight—"But take care that your direction be from A to F so that the landing does not find any obstacle." (Apparently this (and the next instruction) were accompanied by a diagram which is not now available.)

Off Course Correction—"But should the wind deflect the bird's course in a more pronounced curve than its will consents to, the bird will then resume its flight against the wind . . . thus it will go where it wishes and will find itself at the spot marked C."

Stay Over Your Area—"The circular movement of rising . . . will always occur when there is great agitation of the winds . . . and consists of an advancing and reverse movement against the direction of the wind in a course which takes the form of a half circle, and of an advancing and reverse movement which follows the course of the wind . . . for experience shows that in these complex movements the bird rises through the air without being carried too far by the wind along its course."

Flaps Down—"The bird in descending lessens its speed more and more as it is more extended . . . that heavy body is most checked in its descent which is most extended."

Don't Overcontrol—"Inasmuch as all beginnings of things are often the cause of great results, so we may see a small, almost imperceptible movement of the rudder to have power to turn a ship of marvelous size and loaded with a heavy cargo. Therefore we may be certain in the case of those birds which can support themselves, that a slight movement of wing or tail . . . will suffice to prevent the fall of said bird."

Know Your Limitations—"Small birds having simple wings support themselves in the lower air which is thick and would not support themselves in the rarefied air which offers less resistance . . . nature does not break her own laws."

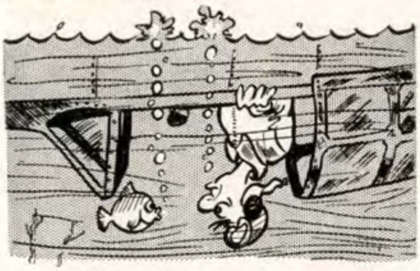
Weather and The Flight Plan—"Nature has so provided that all large birds can stay at so great an elevation that the wind which increases their flight may be of straight course and powerful. For if their flight were low, among mountains where the wind goes wandering and is perpetually full of eddies and whirlwinds, and when they cannot find any spot for shelter by reason of the fury of the icy blasts among the narrow defiles of the mountains, nor can so guide themselves with their great wings as to avoid being dashed upon the cliffs and high rocks and trees, would not this sometimes prove to be the cause of their destruction? Whereas, at great altitudes, whenever through some accident the course of the wind is changed in any way whatsoever, the bird has always time to redirect its course, and in safety take a calm flight, which will always be entirely free; and it can always pass over the clouds and thereby avoid wetting its wings."

"We may therefore say that such an instrument constructed by man is lacking in nothing except the life of the bird, and this life must needs be supplied from that of man . . . these movements will be capable of being comprehended by man's understanding; and that he will to a great extent be able to provide against the destruction of that instrument of which he has himself become the living principle and the propeller."

Leonardo da Vinci, who strived to help man claim his "deferred inheritance in the sky," had great expectations of the being whom he understood so well. It would be a source of wonder to him if he could observe modern man, who has the advantage of the 20th Century knowledge, continuing to bring himself and his wings to destruction.

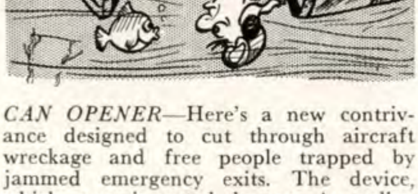
KEEPING CURRENT

DILBERT DUNKER—Navy Special Devices have taken a big step toward teaching their pilots safe underwater escape after ditching. At the Naval Academy, Annapolis, Maryland, they have installed the cockpit section of an SNJ at the top of an inclined track which gives each midshipman a quick ride down into a swimming pool. The "dunker" capsizes when it hits the water. The midshipman must release his harness and safety belt and make an underwater escape, as part of his training.



CAN OPENER—Here's a new contrivance designed to cut through aircraft wreckage and free people trapped by jammed emergency exits. The device, which was invented by an Australian mechanical engineer, consists of a razor-edged steel spearhead, eight feet high, mounted on an armored car chassis with four-wheel drive. Driven forward at a rate of 12 miles per hour, the spearhead pierces the fuselage of the plane near the tail and behind the last passenger seat. The moment the tail unit is severed from the fuselage, a steel hawser is thrown across the tail from a moving tractor and the two parts of the plane are drawn apart, allowing the trapped to escape.

The invention, which was recently demonstrated successfully at an RAAF station near Melbourne, can be used even if the aircraft is in flames, and under any circumstances the "incision" is accomplished very quickly as the blade slices through the fuselage of an airplane as though it were made of paper.



CAA SAFETY FILMS—"Safe Airmen" and "Safe Flight Operations" are two films recently completed by the safety-minded CAA. "Safe Aircraft" and "Safety in Aviation" are soon to be released. All films distributed by CAA are free and available to any interested groups. Last year over 2,500,000 people were exposed to flying safety through the medium of CAA films.

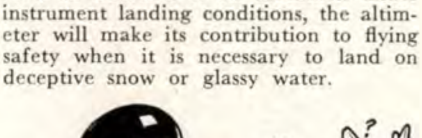
• • •

TOM THUMB PRESERVERS—Junior-sized life preservers designed especially for children (military dependents) who ride MATS planes are one of the latest developments to come out of AMC's Aero Med Laboratory. The new preservers come in two sizes: one for tots from six months to six years; the other for six to 14-year-olds. Unlike the grownup's version, the children's preservers have the cylinders and inflation valve located behind the neck, out of the wearer's reach.

CIVIL PILOT ID CARDS — Civilian pilots will be required to carry identification cards. CAA says this will be mandatory by 1 September 1951. Anyone wishing to keep his civilian license effective can secure the necessary forms at the nearest CAA office where it will be required that the form be filled out in the presence of a CAA official.

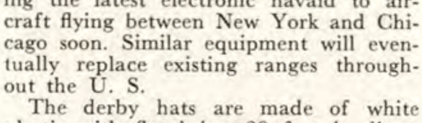
• • •

WHERE'S THE GROUND? — From Canada comes word of another pilot's delight in the form of a new radio landing aid which indicates altitude in the crucial zero to 125 feet spread. Little neon lights on the instrument panel flash on, indicating the exact number of feet. In addition to its usefulness under instrument landing conditions, the altimeter will make its contribution to flying safety when it is necessary to land on deceptive snow or glassy water.



DERBY HATS—The first fully equipped VHF airway featuring "derby hat" structures at 100-mile intervals will be bringing the latest electronic navaid to aircraft flying between New York and Chicago soon. Similar equipment will eventually replace existing ranges throughout the U. S.

The derby hats are made of white plastic with flat brims 30 feet in diameter, topped by six-foot "stovepipes." The structure houses two types of electronic equipment: omnirange and distance measuring equipment, the latter inside the stovepipe. Used together, CAA says aerial navigation will be far safer, simpler and surer.



CYCLIC DE-ICING SYSTEM—Flight tests by All-Weather Flying Division on the Goodrich Electric cyclical de-icing boots installed by Lockheed on an F-94B aircraft have revealed that the system operates satisfactorily on all surfaces in icing conditions, varying from light to severe. All-Weather Flying is continuing evaluation.

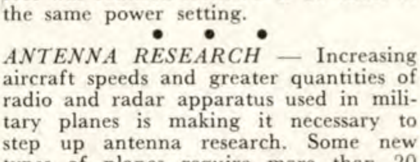
Also, All-Weather will study effects of ice accumulation on wing tiptanks and vertical stabilizer—drag control and stability. During flights already made, it was found that ice accumulation of one-inch increased stalling speed from 50 to 70 knots, and with an inch and a half accumulation of clear ice, IAS at 14,000 feet was reduced from 70 to 80 knots at the same power setting.

• • •

ANTENNA RESEARCH — Increasing aircraft speeds and greater quantities of radio and radar apparatus used in military planes is making it necessary to step up antenna research. Some new types of planes require more than 20 antennas making it an engineering "must" that some method be devised to have these antenna flush with the skin of the plane and still keep such flush antennas as efficient as the outmoded types. Antenna laboratories and testing equipment in Lockheed Aircraft's new research center will go a long way toward solving this problem, giving pilots greater range and more time to act upon information received by radio or radar.

• • •

BETTER PILOTS—CAA has recently completed a study of private pilot accidents which will undoubtedly lead to higher skill requirements for civilian pilots. A comprehensive written examination will also be part of the new plan to put more safety into private flying. It was decided that lack of aeronautical knowledge and inadequate training was largely the cause for the high rate of accidents.



THREE-IN-ONE—It's a glider . . . It's a piston plane . . . It's a jet . . . USAF's first all-jet cargo transport, the Chase XC-123-A, made its first successful jet test flight recently, becoming the first aircraft in the world to have flown piston powered, jet powered, and as a glider.

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FASHION NOTE— A forward thinking designer in England has come up with a snappy little wrist altimeter for gentlemen who have to leave in a hurry. Its main task is to show the wearer when breathable regions have been reached, but the thought comes up that it might help to relieve that lonesome feeling on the way down—at least one gage to keep the empty-handed pilot company. Then there is always the possibility that an automatic radio could be incorporated calling out SOP's and landing instructions just to help create a normal "atmosphere."

CROSS FEED ★

FLYING SAFETY IDEA EXCHANGE

SNAFU CREW—New light has been thrown on safety in the air by the 19th Bombardment Wing and its attached organizations, using skits to illustrate mistakes and how to correct them.

The first skit in a series which will include contributions from all squadrons, was presented by Flight "D," 11th Rescue Squadron, MATS. They dramatized the rescue of aircrews, the main problem being that of finding the exact location of the plane in trouble.

The first scene was in a theoretical C-54 on a flight from Haneda Air Base to Guam. A vivid illustration of the situation was presented with the crew in ultimate "SNAFU" condition. Coke bottles, aeronautical charts and comic books were strewn all over the cockpit in a disorderly manner, and the navigator was cutting out paper dolls.

Scene Two showed the Rescue Squadron Coordination Center combining its efforts and being practical about the situation so that everything ran smoothly.

Both the rescue and "SNAFU" aircraft were simulated in the third scene. The rescue aircraft was trying to home in on the plane in distress and escort it back to the base. After much extra work on the part of the rescue personnel, the plane's position was determined and then came the job of persuading the C-54 pilot to follow instructions in order to make the rescue mission successful.

By the time the rescue party sighted the ailing plane in the fourth scene, the C-54 had been ditched improperly (they had not been in the habit of following instructions); the Air Rescue Service dropped lifeboats and survival equipment and then directed a ship to the scene.

All during the skit, the "SNAFU" crew didn't realize that the impending danger was due to little knowledge of Tech Orders, emergency drill, crew cooperation and many seemingly minor though important responsibilities that go with flight safety. Their motto was "Take off and pray that we will get there," so it caused a great deal of disruption and hard going for the rescue personnel.

The skit's lesson—that pilots realize rules and regulations in flying procedure are very necessary to save the aircraft and the lives of its crew.

PIO Hq 19th Bomb Wing

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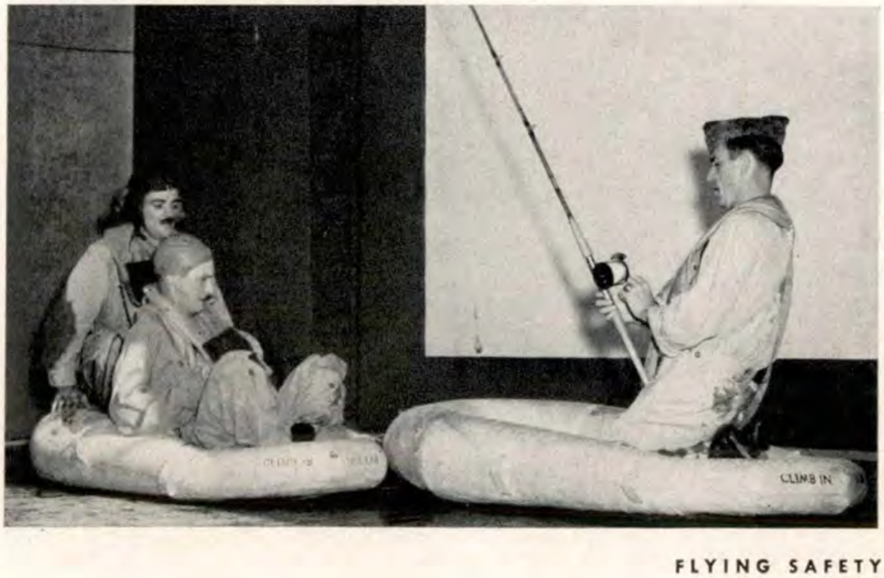
SUNBURNT HOSE—The bright California sunshine was a pain in the hose for the 317th Fighter All-Weather Squadron, temporarily stationed at George AFB, near Victorville. But, on-the-job ingenuity soon settled the trouble.

The problem was this: In warmer weather it is necessary to raise the plastic canopy of the 317th's F-94 all-weather jet. On sunny days when the planes are lined up on the flight line facing west, the sun's rays focus through the canopy onto a short loop of rubber pressurization hose at the rear of the cockpit, and after short exposure, the intense heat burns the hose through. This "sunburning" is the first such happening reported on new aircraft. This phenomenon was discovered about the middle of February when on a bright day the hose on three of the planes burned in rapid succession.

A hood covering of some kind was suggested by Major James A. O'Brien, squadron engineering officer, whereupon, he designated

In safety skit, snafu crew gossip, tune in jazz, rather than check on position.

Final scene, enacted by Flight D, 11th Rescue Squadron, shows a crew of ditched aircraft trying to get along in their own way without regard for survival technique.



S/Sgt. Roy V. Matlock installs hood to prevent burning pressurization hose.

handyman S/Sgt. Roy V. Matlock, crew chief on one of the F-94's, to solve the dilemma.

Sergeant Matlock first equipped himself with a section of rough, unbleached target cloth, a pair of scissors, and needle and thread—then, got to work. He placed the cloth across the top end of the canopy, cut around it to fit, and sewed it. When he had finished, he had a neat snood that capped the top end of the canopy and kept the sun out. He then gave the base parachute shop the original pattern and before long, each plane was equipped with a hood covering.

Major James F. Crutchfield, assistant operations officer for the squadron, commented: "Matlock's ingenuity in tackling this problem is typical of cooperative operations in the 317th."—PIO George AFB.

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AURAL NULL LET-DOWN—One of the most exasperating duties of the Instructor Pilot (Instrument Check Pilot) is that part of the instrument check known as the Aural Null Procedure.

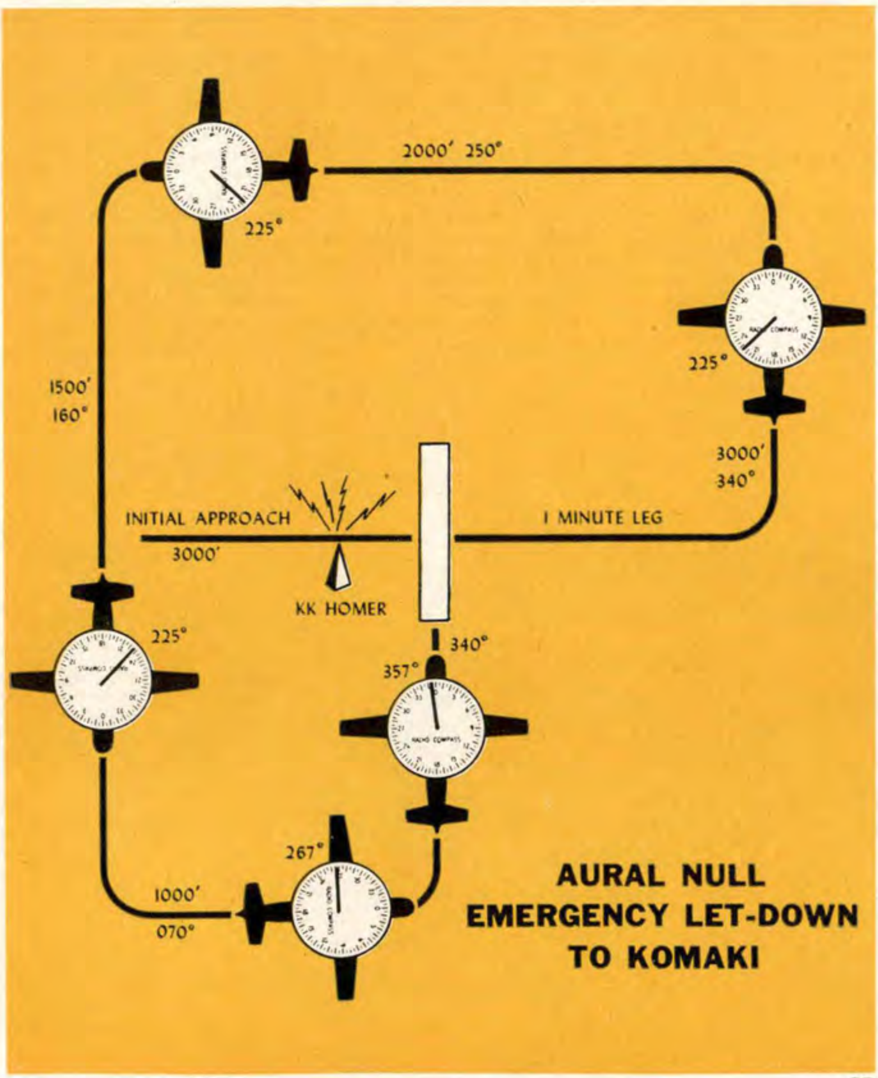
At one time the requirements for AFR 60-4 were the aural null letdown and low approach; however, this has now been modified to include only the requirements to solve the 180° ambiguity and determine the heading to the station. Consequently, when pilots are confronted with the necessity of performing an aural null approach during IFR weather, almost anything can happen and frequently does.

Following a recent major aircraft accident which it is believed was partly caused by the pilot's lack of familiarity with aural null procedures, the letdown diagrammed here was developed for this station. A number of pilots at this base have flown it and say its simplicity is the chief selling point.—*Flight Safety Officer, 6106th Air Base Squadron.*

•

Basically, the steps are as follows:

- **Cross the KK Homer at 3,000 feet preferably on an easterly heading to permit a three position check in the pattern.**
- **Continue on the same heading for approximately one minute after identifying your position over the homer.**
- **Turn to a heading of 340°, maintain 3,000 feet, check with width of null not to exceed 10°.**
- **Set radio compass needle on 225° and do not reset until aircraft is on base leg heading 070°.**
- **Hold heading 340° until signal fades on radio compass indicating station to be 45° to the left and rear of the plane.**
- **At this point turn left to 250° and descend to 2,000 feet. Maintain heading until signal fades indicating again the station to be 45° to the left and rear of the plane.**
- **Turn left to 160° and descend to 1,500 feet and maintain heading until signal again fades, indicating position of aircraft.**
- **Turn left to 070° descending to 1,000 feet and reset radio compass needle to 267°. (Normally the radio compass needle is preset to 280°. The 10° ahead of the wingtip is to allow for the radius of turn to the station. This procedure is standard when the homer is in line with the runway. However, at Komaki the homer is located 3,000 feet west of the runway, thereby causing the need for delaying the turn on the final approach.)**
- **When a null is identified, turn left to 340°. Reset radio compass needle to 357°. Hold heading of 340° or as near as possible to that heading to permit the null to be maintained on 357° on the radio compass. Descend to a minimum of 600 feet.**



Flying Safety

RESTRICTED

DEPARTMENT OF THE AIR FORCE
THE INSPECTOR GENERAL, USAF

Major General Victor E. Bertrandias
Deputy Inspector General
For Technical Inspection and
Flight Safety Research

DIRECTORATE OF
FLIGHT SAFETY RESEARCH
Norton Air Force Base, California

Brigadier General Richard J. O'Keefe, Director

Vol. 7, No. 6 JUNE 1951

CONTENTS

COVER PICTURE:

With this issue of FLYING SAFETY we introduce a new cover design. We hope you like it and will look for it in the future. The man in the photo is Capt. Paul Couch, now a B-36 aircraft commander at Rapid City AFB. The photo was taken by LOOK photographer Philip Harrington.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 9 August 1950.

Facts, testimony and conclusions of aircraft accidents printed herein have been extracted from USAF Forms 14, and may not be construed as incriminating under the 70th Article of War. All names used in accident stories are fictitious.

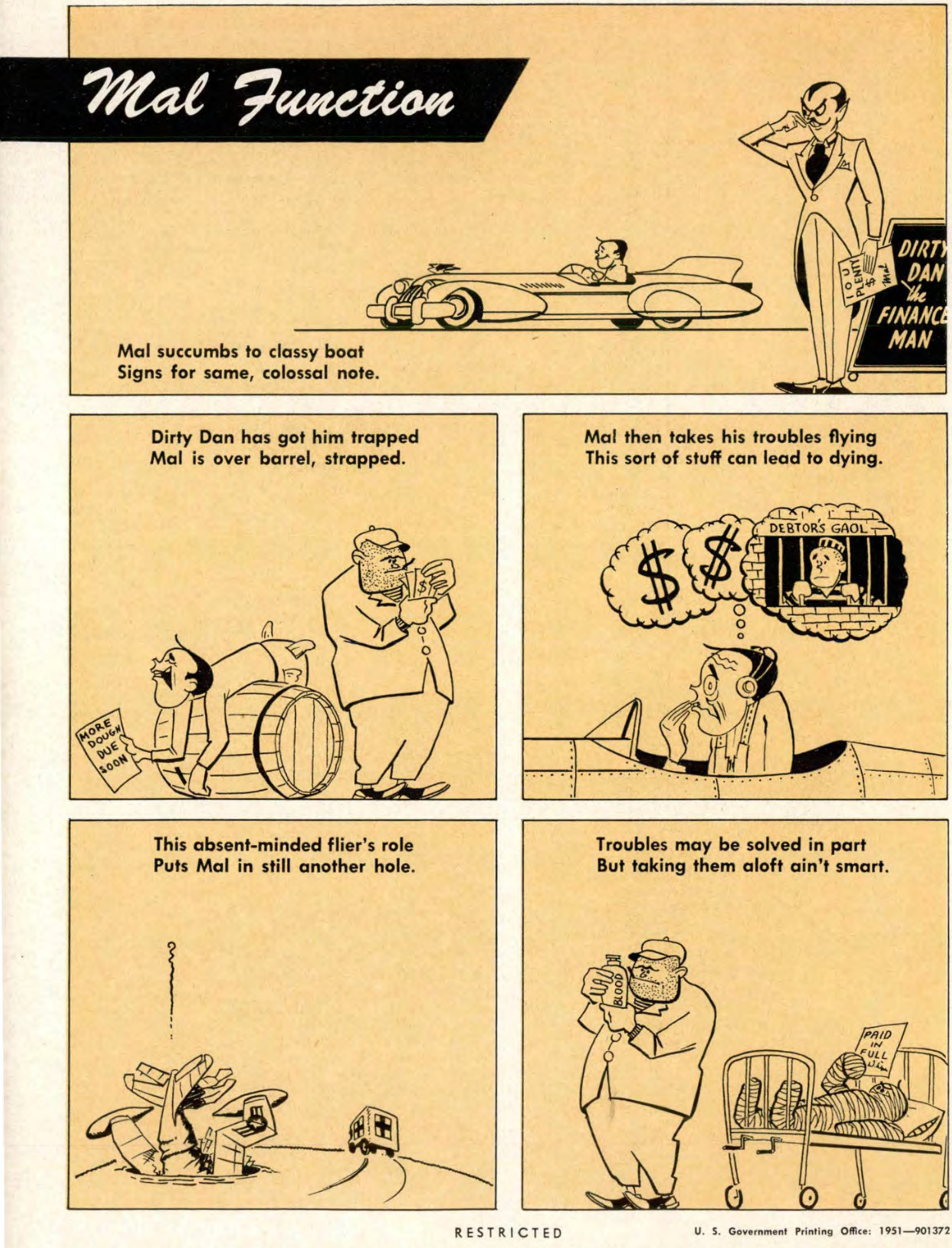
LEARN AND LIVE

Joyce MacKenzie and Randy Stuart—20th Century Fox

Desert Survival IS NO PICNIC

But you can survive in the hot desert if you get rid of fear, forget superstitions and learn the facts. It is the water in your body that saves your life. In summer desert heat keep fully clothed and sit in the shade during the day. Work or walking should be done at night. If you are flying in desert areas, plan before takeoff. In flight, stay on course and make position reports, then if you go down

YOU'LL BE FOUND AND YOU'LL BE ALIVE!



U. S. Government Printing Office: 1951—901372