FLIGHT LINES

FEDERAL AVIATION AGENCY-REGION 3

MAY 1960

FLIGHT LINES
FEDERAL AVIATION AGENCY - REGION 3

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Leonard W. Jurden -
Regional Manager
Marshall C. Benedict -
Editor
Mildred Sylvester
Elsie Seymour
Ass't Editors

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Flight Standards

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George W. Kriske

Budget and Finance
Gerald G. Garrett

General Services
Lola B. Wade

Personnel
Laurence B. Kent

Legal
Pat Wilcox

Aviation Medicine
Doris M. Snow

FROM THE REGIONAL OFFICE

EDITORIAL OBSERVATIONS

Regional reorganization has been going on for some months now and we are all anxiously awaiting the final outcome. Appointments and new assignments of personnel are beginning to come through and we know you were pleased to hear last month of the action in the Office of the Regional Manager starting with the appointment of Leonard W. Jurden as our Regional Manager. Following this, on May 15th it became official that Henry L. Newman had been appointed Assistant Regional Manager.

Included in the "new look" your Editor, Marshall C. Benedict has had his title changed to Public Affairs Officer, with the same responsibilities as before.

Certain of our Regional Office Personnel have been beating a rather regular path to Washington of late, and we hope that additional announcements of appointments will be forthcoming in the very near future. We will let you all know as rapidly as possible.

An effect of the reorganization has been a temporary interruption in the matter of activity reporting in FLIGHT LINES from those divisions involved in the changes. Flight Standards, Facilities and Materiel and others that have been regrouped will soon be reporting to us under their new format.

New Air Route Traffic Control Centers are under construction in our Region at Indianapolis, Chicago and Kansas City. A strike in the construction industry in the Kansas City area has brought that project to a screeching halt, but on the encouraging side, bids for the new Minneapolis Center to be located at Farmington, are to be opened in the R. O. on June 21st and it is expected that construction will begin there soon after.

Your Editor had the opportunity of visiting the new Oakland Center at Fremont, California, last month and was amazed at the size of the facility. Theirs is to be in business sometime in October and is a most impressive site. Certainly worth waiting for.

FLIGHT LINES is published, as we say in the masthead, "For FAA employees and their families," so if you have ideas of other items you would like to read about, or any contributions of material, please send them in to the Editor.

Marshall C. Benedict

Marshall C. Benedict
Regional Public Affairs Officer

THE ILS OR

INSTRUMENT LANDING SYSTEM

by D. F. Perrin KC-650-A

The "ILS", or Instrument Landing System, is the magic carpet that leads an airplane down the path from the air highway to a safe landing on the runway. This is one of the systems used at major airports which electronically assists the pilot to establish a standard approach to a safe landing. Its greatest use comes during periods when airport approach visibility is limited by adverse weather conditions.

The history of the ILS goes back to the early 1930's. After the development of the Low Frequency Radio Range system, it was believed that a facility of this type could be used to guide aircraft down to the runway. Development and experimental work continued through the years, and, in 1939 and 1940, the basic present system, without the glide slope component, was demonstrated at Indianapolis. After 1940, the commercial development of the ILS was delayed by the war. Development for military use, however, progressed rapidly enough so that the Armed Forces were using Instrument Landing Systems during the latter part of the war. Immediately following the war, a number of trailer-mounted portable glide slopes were obtained from the military. Used in conjunction with the associated then CAA equipment, a number of these facilities were installed at busy airports by the CAA for commercial use. This early post-war equipment has been, of course, expanded and replaced by modern designed units. Many changes have been made to increase the ease of their installation, maintenance, and, above all, reliability of operation.

How does it all work? There are the various components of the ILS system located on the ground. It is also necessary that the airplane be equipped with ILS receiving facilities.

On the ground the localizer facility sends out an electronic signal which assists the pilot to horizontally line up the plane with the center of the runway. This signal is received in the airplane by the localizer receiver which controls and moves a vertical needle indicator located in the cockpit. This vertical needle indicator centers on zero when the plane is lined up horizontally with the center of the runway. If the plane is left of the runway centerline, the needle indicator moves to the right, which tells the pilot to fly to the right. In like manner, the needle indicates to the pilot when the plane is to the right of the course. The localizer is usually located on the extended runway centerline about 1,000 feet beyond the far end of the approach runway. It operates in the Very High Frequency, 108 to 112 megacycle, frequency band.

The glide slope is on the ground. This is the part of the ILS that electronically supplies the "magic carpet" angle which provides vertical guidance and assists the pilot in bringing the aircraft from the air highway at the proper descent angle to touchdown on the runway. This signal is received in the airplane by the glide slope receiver which controls and moves a horizontal needle indicator also centers on zero when the plane is on the proper angle of descent. If the plane is too high, the needle indicator moves downward, which tells the pilot to reduce altitude. If the plane is too low, the indicator moves upward, telling the pilot to increase altitude. The glide slope facility is usually located 400 to 600 feet offset from the runway centerline and 750 to 1250 feet down the runway from the approach end. It operates in the Ultra High Frequency

or 330 to 335 megacycle, frequency band.

The two needle indicators referred to above in the description of the localizer and glide slope receivers are actually contained in one instrument shown below which is commonly known as a "crosspointer." When the plane is exactly on course, the two needles cross at right angles at the center of the indicator.

Typical ILS Indicator

There are two ground-based Marker transmitters, an Outer Marker and a Middle Marker. They send up vertical signals which reach into the sky and intersect the ILS pathway and are reported on the instrument panel of the aircraft. These signals provide the pilot with an exact fix as to where the plane is in relation to the distance from the end of the runway. The Outer Marker is usually located on the runway centerline between 5 and 6 miles from the approach end of the runway. The Middle Marker is usually located about 3/4 of a mile from the approach end of the runway. Each of these markers transmits a differently keyed tone as the pilot flies down the ILS pathway. When the aircraft reaches the Outer Marker, a 400-cycle tone, keyed with two dashes a second, is heard on the marker beacon receiver. A purple light also shows in the cockpit. The Middle Marker sends up a 1300-cycle

The Middle Marker, which provides a positive check point on the landing approach.

alternating dot-and-dash keyed tone and an amber light shows in the cockpit. Thus the two markers operate on a frequency of 75 megazycles.

Equipment also has been developed which makes it possible for a pilot to make a "hands off" automatic ILS approach to within a few feet of the runway. If the plane is equipped with an automatic pilot and an approach coupler, this device can be made to lock on to the ILS signal and automatically bring the plane down the ILS pathway to within a few feet above the runway, at which point the pilot disengages the automatic approach coupler and takes over by manual control for the actual landing.

The ILS system operates unattended 24 hours a day, with the exception of short periods once a month when it is shut down for routine preventative maintenance. Operation is checked daily by highly skilled FAA technicians. It is continually monitored automatically so that in case of equipment failure an immediate alarm is sounded in the control tower or other control point. There is dual equipment at both the localizer and glide slope facilities. If one set of equipment fails, the other set will automatically commence operation. If this set also fails, it will automatically shut it-

Glide Slope Site featuring new type antenna mast. At left is Weather Bureau Transmissometer.

self off. Each set of equipment can be dialed on or off or transferred from one set to the other by the use of remote automatic telephone dialing units located at the point of monitoring.

A proper site location for an ILS is imperative for satisfactory operation. How is a site selected?

Let us assume that an Instrument Landing System project has been assigned to the "Lucky Lindy" airport by the Washington office. This project was originally submitted as one item in the years budget by our Regional Program Engineering Branch". The number of instrument approaches or other factors have indicated the need for a facility of this type at this location. An "Instrument runway" has been selected at a conference of representatives of the interested Branches of the Region. The Navaids Engineering Branch has made a preliminary engineering survey and the glide slope and localizer have been theoretically located. An actual electronic site test must still be conducted at proposed glide slope location however, before a permanent facility is installed.

Lets go along on a glide slope site test. An Electronic Engineer or Technician, a Powered Ground Equipment Repairer, and you; travel usually by air to wherever the portable glide slope truck is located. Contact is made with the necessary FAA and Airport officials, making measurements to spot the location, and the truck and equipment are set up. Our International oversize "bread truck" contains a full size glide slope transmitter, ground recording equipment and various transmitters and receivers, as well as its own engine generator for electric power and a complete set of electronic test equipment and tools.

Portable Glide Slope Unit

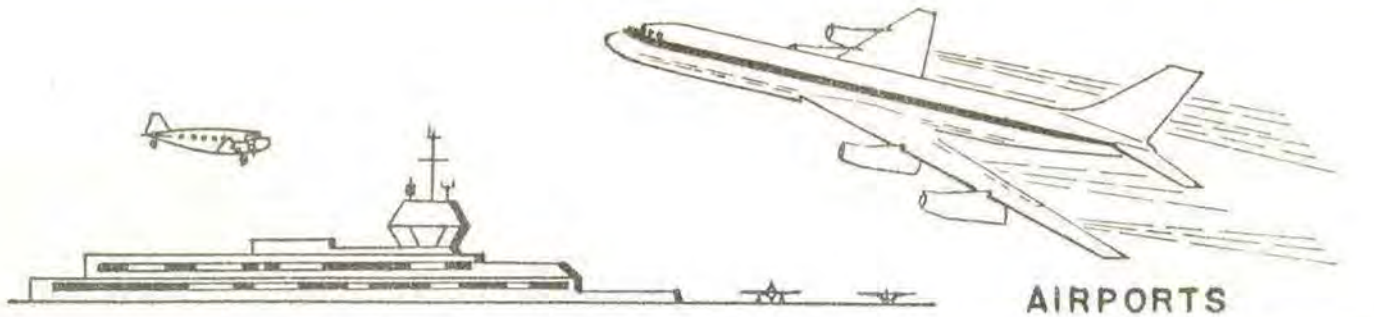
We call the area Flight Inspection office and notify them we are ready for flight check. Their plane and crew arrives on schedule and barring bad weather, we commence. Equality of modulation, and "phasing adjustments" are made to our glide slope transmitter. Several "level clearance" runs are flown at a constant altitude and recorded in the aircraft by an ingenious device that produces a graph recording of up to 24 simultaneous separate instrument readings. On the ground we are tracking the aircraft's vertical angle with a theodolite which is an instrument somewhat similar to a surveyor's transit. For every 0.2° vertical angle change, we press the button as the plane's nose touches the theodolite "cross hairs". This transmits a 1020 cycle tone which marks the aircraft recording. By the use of these marks, the width and angle of the glide slope path can be measured. Next, the path is widened to the normal monitor "wide limit". With this wide path, the aircraft makes several low approaches to insure that sufficient clearance is obtained over all obstructions such as trees, buildings, power lines, and so on. We then return the path to its normal width and make a series of normal "down the path approaches" with the pilot attempting to maintain an on course indication at all times.

Aircraft and corresponding theodolite recordings are made on each of these "down the path" approaches. For synchronization, both aircraft and theodolite recordings are marked simultaneously with a transmitted 1020 cycle tone each 15 seconds by an automatic device in our test truck. These marks permit a later comparison of the aircraft and ground recordings and a composite graph recording can be made which provides a very close approximation of the actual glide slope path. The effects of air turbulence and other factors can thus be evaluated.

With the flying part of the site check over, the portable equipment is dismantled and stored at the airport or driven to the next location. Pictures are taken of the proposed site and of any buildings, power lines, and other objects that may affect the glide slope or localizer courses.

Meanwhile, back at the office, the real work begins. Flight Inspection will make their report on the test, and give the airborne recordings to the Navaids Engineering Branch as soon as they have finished with them. Navaids Engineering will make a thorough engineering analysis of the recorded results of the test and make their report and recommendations to the Planning Branch, with a copy going to the Washington office. The Navaids Engineering Branch has the responsibility of determining what, if anything, is wrong with the site that may interfere with the normal operation of the glide slope. Next to be determined is the cause of this potential trouble. And finally, what can we do to correct it. After all the bugs are worked out, the buildings are constructed, equipment installed, and the facility is flight checked. Then the ILS is commissioned and made available for public use as another contribution to safety in the Air Age.

Localizer Antenna Systems: old above; new below.



AIRPORTS

CHICAGO-O'HARE INTERNATIONAL AIRPORT

Chicago-O'Hare International Airport, today ranking somewhere in the top ten with regard to total aircraft operations, is destined to become No.1 in the nation within not too many distant years; thereby supplanting Chicago-Midway, which now holds and has held this top honor distinction for a good number of years in the past. Retreating 15 to 20 years in the past, this would have been difficult to visualize except to those certain groups of people who fortunately had the foresight and planning ability to begin the task of the airport development.

O'Hare Airport, as it exists today, had its planning studies initiated in the early 1940's by several civic organizations. At that time the City of Chicago faced the necessity of expanding its airport facilities. The growth of passenger traffic had been phenomenal. In 1936, for example, less than 100,000 passengers used the Midway Airport, while in 1946, approximately 2,500,000 passengers were handled.

With the necessity for additional airport requirements established, the Postwar Economic Advisory Council of Chicago appointed an Airport Site Selection Board in 1944 to consider the available sites for the establishment of a new airport. The Board began with 10 sites in the Chicago area, of which 5 were eliminated in the early stages of study. Those remaining for final study included the present Midway, Calumet, Lake Michigan, Clearing and Douglas sites. The Selection Board, after carefully weighing all possibilities, recommended Douglas, 18 miles northwest of the downtown loop, as the site of Chicago's future principal airport. This was the location of the Federal Government constructed aircraft plant, leased to the Douglas Aircraft Company, and adjacent runways, taxiways and aprons which served as an aircraft proving ground during World War II. It consisted of a nucleus of nearly 1400 acres of government owned property surrounded by acres of additional land available at a minimum of disruption to established facilities.

In 1945 the City Council approved the site recommended by the Selection Board. In March, 1946, the War Assets Corporation, having declared the Douglas Airport as surplus, gave the City of Chicago a Quit-Claim Deed to 1,080 acres of the property.

The U.S. Air Force retained 281.24 acres upon which are located the buildings and hangars of the old Douglas plant for continued military use and as a storage depot.

In December, 1946, the City of Chicago retained the services of Ralph H. Burke, Inc., Consultant Engineers, who were empowered to fully supervise all planning, designing, construction and, in short, all engineering required for fulfillment of Chicago's Master Airport Plan. Planning was thus begun to develop the site as an airport for civil aviation.

As a result of rapid technological advances in aviation, many changes have been adopted in the master planning since its inception. In the original planning the proposed runway patterns consisted of ten tangential runways, exclusive of the four existing military constructed runways, radiating from a central terminal area. This pattern was subsequently reduced to six tangential runways, and finally into three sets of parallel runways patterned on a semi-

tangential system. The rapid expansion boom of newly developed jet aircraft, air carrier movements and passengers caused other changes to be made, including an outward expansion of the centralized terminal area. For the most part, however, the original concept of the master plan and its ultimate objectives has remained unchanged since its inception. The basic principal of a central terminal area, with building facilities for the public, with concrete aprons around it for the loading and unloading of aircraft and with short taxiways connecting to groupings of parallel runways exists in present day master planning.

By the end of 1956 the City of Chicago, assisted by federal and state financial aid, had acquired a major portion of the 6800 acres of land, which today comprises O'Hare Airport and had constructed several improvements. These included a new NW/SE runway, 8000' x 200',H.I.L., taxiway, a segment of a proposed terminal building, a control tower, aircraft parking aprons, a heating plant and an automobile parking lot.

In March of 1957 the City appointed the architectural-engineering firm of Naess and Murphy, who with their consultants, Landrum and Brown for airport planning and James P. O'Donnell for fuel storage and distribution, reviewed and modified the master plan to better meet the conditions of jet-age transportation.

The first stage of this modified master plan, consisting of 12 contracted projects to date of this writing, is currently under construction. The primary source of funds for this development are Chicago-O'Hare International Airport Revenue Bonds with a par value of $120,000,000, which are backed by a working agreement with the major airlines. The major portion of the development financed by the bonds is in the terminal and airline hangar areas. This consists of hangars, caissons for the terminal buildings and restaurant,taxi-

O'Hare Tower surrounded by construction work.

ways, apron, roads,utility tunnels, storm and sanitary sewers, underground fuel tanks and concourses. Besides this development, the NW/SE Runway (14R-32L) is currently being lengthened to 11,600 feet.

Over $2,500,000 of Federal and State monies have been allocated to pay for the runway portion of this contract. Upon completion of the first stage program, 61 gate positions will be provided.

The first stage development program has generally been based on meeting the traffic forecasts for the year 1965,at which time it is estimated there will be over five million passengers enplaned at O'Hare Airport. One of the big factors for this prediction is that upon completion of the 11,600 foot runway, Chicago, for the first time, will be linked to European airports by direct jet flights. Some of the airlines which have indicated an interest in flying direct O'Hare - overseas jets include Air France, PAA, TWA, BPAC, UAL, NW Orient, Continental, Lufthansa (German), SAS (Scandinavian), KLM Royal (Dutch), and Sabena (Belgium) World Airlines.In addition, American Airlines plans direct O'Hare - Mexico City jet flights along with CMA, the Mexican airline. Brazilian International Airlines has expressed an interest in direct (though not non-stop flights from O'Hare to South America.

The air passenger of today does not have to look too far into the future to envision Chicago-O'Hare International Airport as the capital and busiest airport in the world.

FLIGHT STANDARDS

WE RECOMMEND REGULATION CHANGES

We sometimes get a laugh out of laws that are still on local statute books about water troughs for horses and such like, but these are not much more out of date than some of our Civil Air Regulations occasionally become because of the rapid changes in the aviation picture.

It is the people who are actively engaged in aircraft engineering work in the field who are in the best position to see the need for changes in those parts of the regulations covering our work. Perhaps the time will never come, aviation progress being what it is, when we will have current regulations to cover all the phases of our requirements. As time and workload permit, we do our best to go over the regulations which apply to our job with a view toward determining their adequacy and applicability to present products and conditions, but quite often we are confronted with need for a change only when we find ourselves unable during the course of our work to apply present regulations to a specific need.

A job can't wait until regulations are revised, so it is often necessary to outline special conditions for immediate action and get Washington's approval. After they are approved, these special conditions carry the same weight as the regulations, and many of them will subsequently become regulations.

Recommending regulation changes is a continuing function. Even where a need has not been created by aviation advances, it is often found that changes are required. Sometimes a regulation is not sufficiently specific and rewording is recommended. Sometimes it is too restrictive, sometimes it is not sufficiently stringent to attain its objective, and sometimes it can be said more clearly and directly for easier interpretation. Whether or not we have up-to-date and workable regulations on which to base our determinations is at least in part up to ourselves. We might grumble and complain when we find ourselves out on a limb, but in the last analysis our regulations are usually what we have recommended. It is a big responsibility to keep a jump ahead in anticipating what we will need and making our recommendations for the regulations that will meet the safety requirements of the new age in air transportation, but it is all a part of our job.

HALL OF FAME

You've heard the old saying "I knew him when....." - Well, it seems that none other than George E. Rife has filed for the August 2 primary election in Platte County for judge of the eastern district on the county court. George worked in the Aircraft Engineering Division for thirteen years before his retirement two years ago. We will look forward, with much interest and speculation, to the coming election.

WELCOME

The Branch extends a hearty welcome to John H. Griffith, Flight Test Engineer and Pilot in our Flight Test Section. We also extend a welcome to Ruby Krentz, who is a new addition to the Propulsion Section clerical staff. We wish the best of luck to Eula Pearce, who has resigned.

Miss Nettie G. Philabaum is being congratulated in the above picture for receiving a Superior Performance Award, Certificate and $150.00 check at FSDO #41, Muskegon, Michigan. Pictured left to right are Richard E. Lighthizer, Corbet F. Dunavin, Miss Philabaum, Alexander M. Samus, Joe J.Macha and Raymond A. Guss of the district office. Miss Philabaum received a Certificate and award of $100.00 in September, 1957. In December she will have completed a total of 20 years service with the Government, 13 years of which have been with the Federal Aviation Agency and Civil Aeronautics Administration.

Congratulations and many thanks to Miss Philabaum for a job well done.

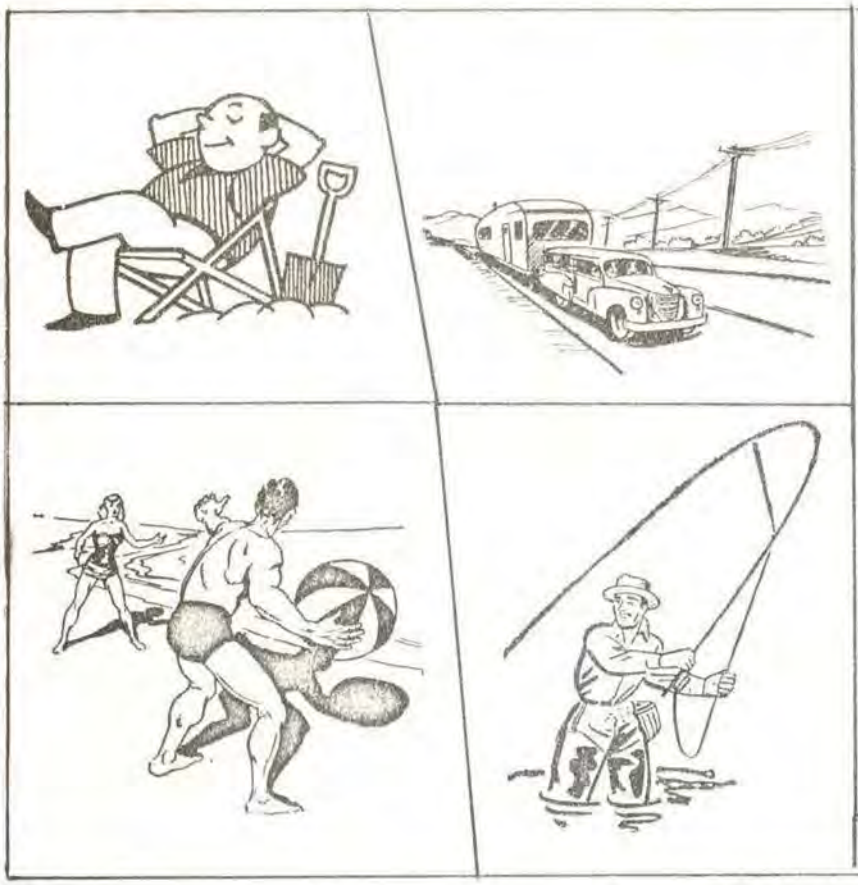
Mr. W. E. Godfrey, Chief of the Plant Engineering Branch - speaking for many of the FAA employees - bidding farewell to Fred H. Mangels, a Construction Superintendent from the Plant Establishment Section, KC-668 - who was selected on the National Promotion Plan for a position in the Washington office. A luncheon was held in his honor on Wednesday, April 13th. The old saying, "Our loss is somebody else's gain" truly applies here; but we wish him well in his new work.

The Aircraft and Avionics Maintenance Section was pleased to have as visitor this week Mr. Bob Payne, Chief Avionics Instructor at the Aeronautical Center, Oklahoma City, Oklahoma.

Mr. Payne spent two days in the avionics shop browsing around observing operations, taking pictures and discussing general operation procedures.

As Chief Instructor, Bob is very much interested in obtaining first hand information about field operations in order to meet our training needs.

Bob Payne, left, Oklahoma City,and Eddie DeBoard, Avionics Inspector.



VACATION TIME

NOW that Spring is here it's time to check into that annual leave situation, the bank account and decide where to go.

Whatever be your "cup of tea" and whether it is to the mountains, the seashore or the relatives back home,

Remember, unless you go by air, you're on your own.

There is no FAA to look after you, no airways, and no altitude separation -

So, take it easy, have fun, come back to work tired and tell us all about it.

ANYBODY FOR ALASKA?

The Federal Aviation Club of Washington, D.C. has put together a tour to Alaska for all employees of the Washington area and has invited FAA employees, families and friends from the other regions to join them. The tour leaves Washington on August 17th but can be joined along the way. The entire group will depart for Alaska from Seattle, Washington on the morning of August 18.

The tour includes thirteen days by air, via Northwest Orient Airlines and includes visits to Anchorage, Portage Glacier, Matanuska Valley, McKinley National Park, Fairbanks, a Tanana River cruise, Whitehorse, Skagway, Juneau, and Mendenhall Glacier. The total price from Seattle and return to Seattle is $478.13.

This promises to be a very interesting tour and offers a considerable saving over the regular tour rate. Included in the planning are numerous visits to various FAA installations while in Alaska.

If you want more information, contact Helen Hazelwood, Chairman, Recreation Committee, FAA Employees Association, Regional Office, Kansas City.

Ozark Air Lines flew its 2-1/2 millionth passenger April 6, 1960. The airline has a no accident record in flying over 43 million miles, a distance equal to 90 round trips to the moon.

FAA has ordered another eight long-range radars designed to increase the capability of the air traffic control system and as another step in blanketing the country with radar coverage.

Fred Blackburn, Air Traffic Area Supervisor in St. Louis, trying out his new office by dictating a letter to his new Secretary, Mrs. Melba Cooper.

Charles L. Jones, Facilities and Materiel Division, receiving suggestion award and check from Harry Bender.

Rosa M. Clay, Flight Standards Division, receiving her suggestion award for a new method of preparation of Performance Reports. The handsome gentleman doing the awarding is K. D. Mackenzie, Chief of the Operations Branch of Flight Standards.

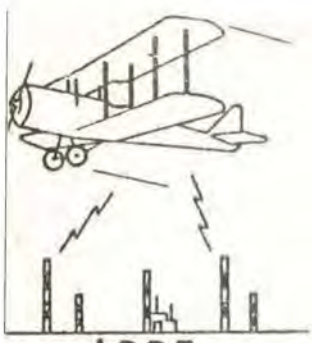
Clyde Pace, Jr., Chief of Airports, discussing the latest in lighting with Omaha Airport Director Richard E. Mooney (left) and Bill Howard, Airport Engineer in the R. O.

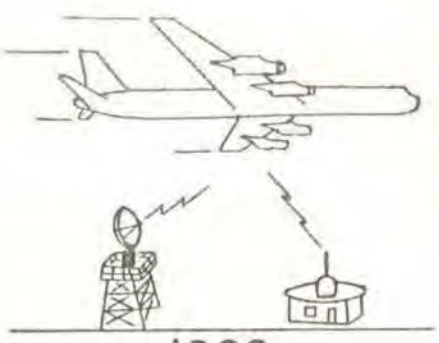
Kenneth W. Hollinger, ATM, has the distinguished honor to be the first in the Region to receive the new style ID card, necessitated by need for same to gain admittance to Operation TRAILSMOKE. Ed Marsh does the honors.

Bichlmeier's Bailiwick. FAA Service Branch Hangar located at Fairfax with one of the Twin Beeches parked in front.

The aerial photographs on this page were shot by your Editor from a helicopter piloted by Ed King, General Operations Inspector at FSDO (G)#11 at Fairfax.

Below - 2 views of the new Kansas City ARTCC under construction at Olathe.





AIR TRAFFIC MANAGEMENT

"FAA's MOST CHALLENGING MISSION"

This month's issue of FLIGHT LINES will be lacking any special or feature article on Air Traffic Management's program or activities, unless we receive an unexpected but welcome "windfall" from the field in the form of such a contribution in the mail before this issue goes to press. We were hoping that our good fortune for the March and April issues would continue and someone else in the field facilities would pick up where the Detroit Center (March issue) and CARF (April issue) left off, and additional articles would become available to carry on the ATM story.

I would again like to make a plea for more material of this type from your people in the field. I believe that a great many readers of FLIGHT LINES are genuinely interested in learning more about what YOU DO, be it in a Flight Service Station, Tower, CS/T, RAPCON, Center, or in your position of Resident Inspector or Air Traffic Supervisor. Remember, many of our own ATM personnel like to hear about YOUR FACILITY, including both past history of development and present day operation, since it is always interesting to compare other facilities with your own and to find out how the "other half" lives.

Additionally, of course, remember that FAA is now a big organization, comprised of many specialized segments and many people who are comparative newcomers to the Agency, recruited from both private industry and other Government agencies, including the military services. Many such people, irrespective of their previous backgrounds and specialized qualifications, have not had the opportunity to acquire knowledge of the functions and missions that our Air Traffic Management facilities and personnel perform in carrying out our own part of the over-all FAA program. The monthly issues of FLIGHT LINES offer an excellent opportunity and medium through which to present this information. We are looking for publication material, not literary masterpieces--so don't feel inhibited by any feeling of inferiority that you are not a professional writer or reporter (who is?). Send in your ideas and we will try to work them into our ATM section for publication.

Don't wait for some other facility to break the ice--send in YOUR article, now!

OPERATION "STRAIGHT LINE". This is the identification given to the test phase of the ARTC Area Office concept of decentralized administration and operation of the ATM field program being conducted in the Cleveland area, as reported to you in last month's issue of FLIGHT LINES. The Cleveland Area test program was started on April 6, and should be completed as of May 21.

Following a detailed analysis and evaluation of the test operation by Region 1 and the Washington Office, decisions will be forthcoming on the proposed adoption of this type of decentralized administration and organization in the Regional Air Traffic Management and Facilities & Materiel field programs.

Bob Davison, Chief of our present Facility Operations Section (KC-522), who we reported in last month's issue is a member of the "STRAIGHT LINE" project team, was in the RO for a brief visit on May 9 and gave us a little information on the experience he has gained to date on this assignment. In summary, although it is much too early to draw any conclusions before the

evaluation reports have been written up and analyzed, the impression seems to be that the "Area Office" concept is workable and practical, within certain prescribed areas of administrative authority and responsibility. These will have to be specifically developed for implementation after the evaluation of the Cleveland Area project has been completed.

We should have more information on the future of the "STRAIGHT LINE" program in another month or so, perhaps including the WHERE, WHEN, and HOW, for F/Y 1961.

LIFELINES. We want to accord special recognition, and give credit for a job well done, to the ATM field facilities listed below. The summarized incidents, which are quite typical of the type of work and the valuable services rendered to pilots of all categories by ATM personnel in the field facilities who are on duty 24 hours daily, speak eloquently for themselves.

Farmington FSS. March 14. Time 1443-1515Z. N8106E, a Mooney (Mite), enroute San Antonio-Little Rock-Paducah, Ky. IFR, reported unable to establish his position, in difficulty (later determined this was due to "a load of ice" and an erratic VOR receiver), and urgently needed to find an airport that was open. After requesting the pilot to tune in the Malden and Farmington VORs and report bearing readings, FAM FSS plotted his position approximately 10NNE of Cape Girardeau. At this point, pilot stated he had zero visibility at 3,000' and about 30 minutes fuel left and requested clearance to descend to a lower altitude for visual flight conditions.

FAM obtained clearance from Memphis ARTC Center, and suggested a heading of 020 degrees to Southern Illinois Airport, at Murphysboro, Ill., which was open. Pilot reported he crossed the Mississippi river about 1655C, was now VFR with 6 or 7 miles visibility, cancelling IFR flight plan and proceeding to Southern Ill. Airport. FAM FSS personnel on duty, Messrs. Branstetter, Schild, and Buss, called the airport to ascertain that the aircraft had effected a safe arrival and the pilot advised that he had very little fuel remaining when he landed.

Kansas City ARTC Center-Lincoln FSS. March 26, 1625-(?)C. MADLY 53, F-84 enroute Springfield, Ohio, altitude VFR on-top, via Jet Route 12V, to Lincoln AFB, called Kansas City Center on 279.6mc (Center common freq.), keying his mike button for CW transmission (voice modulation inoperative).

Lester L. Terrill (an F-84 pilot in Mo. ANG), was working the back-up Hi Altitude radio position in the Center and heard the CW call. He switched the frequency into the speaker over the high altitude sector, manned by Charles M. Wilkins, who was more proficient in reading code. Terrill and Wilkins then teamed up to handle the situation, the latter copying the pilot's transmissions and Terrill transmitting the necessary clearances by voice to the pilot, who acknowledged them. The pilot did not abbreviate his messages (spelling out K-A-N-S-A-S C-I-T-Y C-E-N-T-E-R, for example), and at one point where his flight altitude had been misinterpreted by Wilkins he came back with the correct altitude by CW. The pilot's OMA estimate and altitude were requested by the Center, which were furnished by the pilot, plus his LNK estimate.

When the aircraft approached the OMA-LNK terminal area where a letdown would be necessary, Joe P. West served as coordinator between the Center and LNK Approach Control (military tower). However, he ascertained that none of the Air Force Tower personnel were capable of reading CW and handling the aircraft through this medium of communications. Therefore, he arranged to

have Lincoln FSS monitor 363.8mc (Approach Control channel) receive further messages and acknowledgements from the pilot as he complied with approach control instructions, through interphone coordination between Center-LNK Tower-FSS. Don Buhls and John Faltermeier at the Lincoln FSS participated in this rather unusual and ingenious operation, which exemplified teamwork and cooperation on the part of the various facilities concerned to the Nth degree under conditions that, otherwise, might well have required the pilot of the F-84 to execute an emergency descent and caused an appreciable delay to other IFR traffic in that area.

Kirksville FSS. April 9, 2144-2328C. N2354D (type aircraft not given) contacted IRK FSS and advised he was on a VFR flight plan from Moline, Ill. to Kansas City, Mo. and had encountered strong headwinds enroute and would need to land and refuel prior to reaching his destination. He advised he was accompanied by his wife and 18-month old child.

Kirksville Airport was closed to all operations due to extensive construction on the field and the pilot was advised that the closest airport was at Macon, Mo., although it is not lighted at night except on request. IRK FSS suggested that the pilot proceed to Omar Bradley Airport, Moberly, Mo., which is a lighted airport, and the direction and distance from IRK was furnished. The pilot acknowledged and requested that his flight plan ETA be extended 1:30 to reach Moberly. At 2202C, the pilot requested and was furnished the IRK surface wind and the winds aloft analysis for the IRK area. Fifty minutes later, the pilot reported he should be close to Moberly but was unable to see a rotating airport beacon or field lights. IRK FSS advised they would telephone Moberly and request the airport lights be turned on, if they were off for reasons unknown to the FSS. After inability to establish contact with the Moberly Airport by telephone, IRK FSS explained the problem to the telephone operator and was connected with the Police Dept., who advised they would take an electrician to the airport to place the lights in operation if they were found to be off.

In the meantime, IRK FSS requested the pilot to tune his VOR receiver to the Macon and Columbia Omnis and report the bearings received. This revealed the aircraft was over the north edge of Macon, Mo., and the pilot reported he now had 10 to 15 minutes of fuel left. The pilot was requested to circle over Macon and was given the direction and distance of the airport from the State Highway Patrol radio transmitter tower, which he had in sight. A telephone call was made to the Highway Patrol at Macon, a patrolman was immediately dispatched to the airport to turn the lights on, and at 2324C (one hour and 40 minutes after his first contact with IRK FSS) the pilot advised IRK his fuel gauges read "EMPTY" (this is a real thrill at night, to those of you who may not have given it much thought before!). At the same time, the pilot advised he now saw the field lights, which had been turned on by the Highway Patrol, and he landed 4 minutes later, with fuel tanks still reading "EMPTY".

The report of this incident from IRK FSS states that at no time did the pilot ever indicate he was lost or uncertain of his position until they advised him his position was over Macon, instead of Moberly. Needless to say, he was most appreciative for being positioned and directed to the airport for a safe landing. Full credit is due to Robert M. Simmons and Jerry L. Fink, on duty at IRK FSS, plus the excellent cooperation rendered by the telephone operators, Moberly Police Dept., and the prompt action of the State Highway Patrol at Macon.

Garden City FSS. April 19, 1540C. This is another unusual incident, reported to us by a letter from the Com-

mander, Hqrs., Air Proving Ground Center (ARDC), Eglin AFB, Fla., dated May 6, 1960. The letter states that Air Force 72740, a C-54, was enroute to Colorado Springs on an IFR flight plan and near GCK they lost voice modulation on their transmitter, although still able to receive transmissions from ground stations. The Flight Service Specialist, Guilford D. Smith, recognized that AF72740 was unable to make voice transmissions but was able to key his carrier wave with the microphone.

Through a type of "20 QUESTIONS" program initiated by Mr. Smith, and answers from the pilot through a series of "Yes" or "No" responses by mike key clicks, sufficient information was obtained by GCK FSS to permit the aircraft to continue on the IFR flight plan. The letter from B/Gen. Robert H. Warren, Commander, states that the radio trouble was corrected some 25 minutes later; however, except for the initiative displayed by the man on duty at GCK FSS, it would have been necessary for AF72740 to land at the nearest airport where VFR conditions existed.

Joliet FSS. April 25, 1726-1752C. The JOT FSS received a phone call from Governor's Airport, Chicago Heights, Ill., indicating that an aircraft was apparently in distress over Chicago Heights. This information was received by George P. Biehl, who gave it to Galen R. Burge, working the Air-Ground "A" console. An immediate blind call was made for any aircraft in distress to answer. Navion 896MD (Note: "MD" suffixes to aircraft serial numbers are normally assigned to members of the Flying Physicians Assn.) immediately answered JOT FSS and reported that he had been over CGT at 1711C and had proceeded to Gary, Ind. airport and had worked them on 122.8mc (unicom), but that airport was closed in by weather and he was now attempting to locate Hammond, Ind. Airport.

Navion 896MD was on a VFR flight plan from Cedar Rapids, Iowa to Chicago Midway, or Joliet. He advised that flight visibility was poor and he was lost, receiving Peotone VOR very weak. JOT FSS contacts with the pilot indicated he was unfamiliar with VOR or LF range orientation or navigation. At 1733C the pilot said he would return to Gary but visibility was 1 mile and he was 500 ft. above ground. At 1737C contact was lost (probably due to extremely low altitude). At 1740C contact was re-established and it was apparent the pilot was still encountering poor visibility and low ceilings (Meigs Tower reported ceiling estimated 200 ft., overcast, visibility 1-½ miles, fog, haze and smoke), and would be unable to land at Gary or Hammond. The pilot was given a VHF/DF steer of 290 degrees for Joliet Airport. At 1746C the pilot reported altitude 1,000 MSL in heavy rain (look at a Chicago Sectional Chart). Field elevations in the Joliet-Chicago Hts.-Peotone area run from 582 to 790 MSL, with stacks, radio and TV towers 910, 965, and 1,330 ft. MSL. Wonder if he ever looked at this data, before or after!). He was given another VHF/DF steer of 295 degrees and landed Joliet at 1752C, with 15 minutes of fuel remaining.

The pilot was profuse in his thanks for the service he received. This was, no doubt, influenced by the fact that his wife and two small children were also aboard on this occasion. Varon W. Harvey acted as coordinator in handling this incident, with Messrs. Biehl and Burge.

Each of the above incidents illustrate that our personnel on duty in the field facilities can be counted on to display high caliber judgment and initiative when the chips are down, and this is where the real payoff comes, since the safety of lives and property are at stake and often are in the hands of one or more of our individual ATM personnel until the final outcome of the incident is established. Congratulations are certainly due to the personnel who were involved in

handling each of these 5 incidents described in this issue; however, we know that these are only specific examples of literally dozens of other cases that occur with almost daily regularity and do not come to our attention.

VISITS: Places visited since the April issue was published: Wichita (FSS, TWR, RAPCON), Chicago (MDW TWR, ATC Advisory Committee Meeting), Detroit (DTW FSS, Center, ATC advisory Committee Meeting), Champaign CS/T, Lincoln (LNK TWR, UNA FSS), Des Moines (FSS, TWR), Austin, Minn. (unscheduled WX stop!), Minneapolis (FSS, TWR, Center, and ATC Advisory Committee Meeting), Indianapolis (FSS, TWR, Center, and ATC Advisory Committee Meeting), Emporia (FSS), Hutchinson (CS/T, and "FOOTPAD" GCI Site), Garden City (FSS). Attendance was also planned at the St. Louis ATC Advisory Committee Meeting on May 5, but MKC FAWS painted a gloomy picture of WX developments that indicated the return trip from STL to MKC would be extremely questionable due to a forecast of severe weather conditions. Therefore, discretion took precedence over our well intended plans and this trip was cancelled until more favorable circumstances.

In flying these trips, we noted that the increased emphasis on the PIREP program is very much in evidence in monitoring Omnis and the FSS frequencies, in particular. We received a number of PIREPS and weather advisories that were very helpful on our own flights and we heard many other pilots receiving similar information. This is an area that should be exploited to the fullest degree by all ATM facilities, and especially the FSS, since it represents a type of service to general aviation pilots that is invaluable and not obtainable through other sources.

CORRECTIONS: In the April issue of FLIGHT LINES, some of you may have noted what was an obvious typographical error in the article on CARF. A slip of someone's finger on the keyboard (and we won't say whodunnit) on Page 7, left-hand column, made the commissioning date of CARF July 24, 1946 instead of 10 years later. This is just to forestall any snide remarks from eagle-eyed, well informed,critics.

Another error, this time one of OMISSION rather than commission, occurred on Page 19, right-hand column. We made mention of our 9 Resident Inspectors and listed all of the locations that added up to this figure. We omitted Selfridge AFB, which would have brought the total up to 10. Ray Brock probably is wondering if he has been disinherited by the ATM Field Operations Division No. 3. My personal apologies, Ray--this was my own private goofup!

FOREIGN CORRESPONDENTS COLUMN. Nothing to report. No word from Tad Matucha in Pakistan regarding the success, or failure, of his tiger hunt in India this month. If we don't hear further from him----do you suppose that Bosun's chair was put high enough in the tree to be out of reach of the tiger? Look in the June issue for the answer.

FANCY FOOTWORK

Little did we know how much talent was contained in the FAA until the night of the Blossom Ball. A chorus composed of Fran Livesay, Sarah Boyce, DeLoris Peterson, Sandy Davis, Eula Lett,Helen Leighow, Ursula D'Angelo and Marsha Neely performed second only to the famous Rockettes.

Bedecked with grass skirts and other Hawaiian trimmings, such top talent as Leland Covert, Tom Davis, Kenny Geier, Doyle Hegland, Darrel Hottman, Dick Sporer, Elliott White and Chet Wells entertained the group with hulas, et cetera.

Dancing climaxed the evening, which by all reports, was a tremendous success.

PERSONNEL HI-LITES

The Training Branch in FY 1960 has given the forty-hour Management Course at Chicago, Detroit, Minneapolis, Indianapolis, St. Louis, Milwaukee, Omaha, Kansas City, and the Regional Office. The eleventh and final course for the year will be conducted at Wichita, Kansas, the week of May 23.

The excellent support of all divisions has helped our Training Officers lead worthwhile sessions on many supervisory problems.

A total of 175 Region Three supervisors will complete this supervisory training during the present fiscal year.

Presently the Training Branch expects to give fifteen courses in the FY 1961. The places and dates will be announced in the near future. The announcement will enable field program divisions to plan travel and scheduling for classes.

COORDINATING WORK

Coordination is concerned with harmonious and unified action directed toward a common objective. It is not a separate activity, but a condition that should permeate all phases of administration.

An executive faced with the need for improving coordination should consider a number of approaches. Sometimes changes should be made in the structural or "built-in" provisions for coordination. Important here are, (1) creating divisions and departments in which the most frequent coordination problems can be resolved within an organization unit itself; (2) clarifying the organization and procedures so that no doubt exists as to who does what; (3) designing flow of working papers, reports and other methods of communication so that information needed for coordination advances promptly to the right persons as a normal procedure.

In some situations there is need to harmonize programs and policies. Plans, especially those developed by separate individuals or division, should be checked for consistency. Also, the scheduling and other timing arrangements should be reviewed.

Still another approach is to promote voluntary coordination among subordinates. This can be done by instilling dominant objectives, developing generally accepted customs and terms, encouraging informal contacts, providing liaison men where needed, and using committees.

Finally, there will remain some coordination problems that can be resolved best by the personal attention of supervising executives, or, when they are very busy, by staff assistants or staff divisions working as representatives of the executives.

HOW TO GET RESULTS FROM BUSINESS WRITING: THE REPORT

Writing reports is a necessary function in any management job according to James Menzies Black in Chapter 15 of How to Grow in Management (Copyright 1957, Prentice-Hall, Inc.). Author gives pointers on how to make report writing easy and interesting. We quote the following excerpts: (Complete chapter available on request. See reply card.)

The things people dread doing they usually do poorly. If you approach the job of report writing in the wrong frame of mind, you are likely to be spectacularly unsuccessful. In your haste to get through you may gloss over facts or record them inaccurately ....Report writing should be a challenge, not a bore! ...

But if you think of reports as simply useless paperwork which... stifles your creativity and prevents you from attending to more important matters, they will be just that. You have refused to accept a responsibility of leadership. Ask yourself why: Are you afraid of the mental discipline you must exercise to put your thoughts in logical sequence on paper: Do you doubt your ability to do it? Are you lazy?...

DANGER POINTS IN REPORT WRITING

1. Overselling

...If you have the facts, if you have analyzed them properly, if your conclusions show sound judgment, you do not have to be a polished writer to prepare the kind of reports your management wants. But even if you have the ability to gather and evaluate facts, there are dangers against which you must guard.

Don't become so enthusiastic about a project or an idea that your report becomes a propaganda instrument for your point of view. If you exclude facts that damage your case, or perhaps present them in a rosy light, you can be sure that someone else will spot your omissions and they will loom much larger than they really are. It becomes apparent you had a reason for overlooking them...

It is never smart to be tricky. Don't try to gloss over or skip the facts because they are counter to your argument or recommendations. When you give all the pros and cons of the matter yourself, you are not vulnerable, but actually are in a far better position to discount arguments that are contrary to your proposals.

2. Overwriting

Business writing is no place to build an expansion attic for your prose. See your objective and try to reach it in the fewest lines possible. Keep your words simple and to the point. However, in trying to achieve conciseness do not exclude facts that are necessary to give meaning to what you say or are needed by the person who must decide what to do on the basis of data you have provided.

Slant your report to the tastes of the person who will receive it... When you write a report, think of your boss as an editor. If he is the kind of man who is a bug on detail, give him the facts - plenty of them - in such a way that he can chew on them. It may take you longer to prepare your report, and you may include considerable information in it that could perhaps be omitted if the report were going to anyone else but your boss. On the other hand, if your superior is the sort of fellow...who thinks that a good history of mankind could be written on a single sheet of 8½x11 paper, he simply would not read much detail. He wants an outline of the facts in one, two, three order and eye's-sweep summary of your recommendations...

Rigidity of any sort is a deterrent to advancement in management. In your report writing be flexible and adapt your methods to the requirements of your superior...

HOW TO PREPARE A BRIEF OR ABSTRACT

We live in an era of speed. Competitive survival in business depends on swift, sure action, and management has little time for business small talk. When you write a report you should take into account the time your reader can devote to it. Give him a quick, fast-moving summary of what you have to say in your report proper. This is called a brief or an abstract. It is simply a digest of your essential conclusions and recommendations, and it permits your superior to see at a glance the broad outline of your proposals. Then if he wants to check your supporting evidence he can get it from the main body of your report...

STEPS TO REPORT WRITING

1. Fix your objective. You do that when you put down your title.
2. Prepare your outline. This en-

ables you to concentrate on reaching your objective.

3. Start with an introduction. This explains why you are writing a report.

4. Fill in the outline. This is the main body of your report. It will vary according to the nature of your study. If your report, say, is on the advisability of purchasing a new machine, you would describe the equipment, explain how it works, discuss how it could be advantageously used by your company, and cite examples of how other companies have utilized it and with what results.

5. Give your conclusions or recommendations. This is simply a review of the facts that you have presented together with your proposals for action.

BOWLING SEASON TURKEYS OUT

Recently, the FAA Regional Office Bowling League's Banquet was held at the Wishbone, and fifty-six persons gathered for a gala evening to herald out the end of a successful and fun-filled season of bowling. Actually, there were no turkeys; but lots of steak, chicken, shrimp, etc. Tom Davis, President, MC'd the proceedings and presented the first place trophies to the bowlers on the "Voodoo" team.

Del Ulstad (Captain), Charles and Mable Bevis, Claude Roper and Hal Phalp were the lucky and deserving champs.

Clyde Smith, Treasurer, was considered the "most popular man of the evening" when he gave out the long-awaited prize money. Special honors went to Mable Bevis and Ken Whitney for the most improved bowlers of the year. Men's hi 30 scratch went to Earl Riney who had a 618 and Marion Strickland won hi 10 scratch with a 226 game.

Women's hi 30 scratch was won by Marie Yulich with a 554 series and De Loris Peterson won hi 10 scratch with a 224. Two surprises came when the last place team was awarded "consolation" trophies and Madeline Marsh was named the most reliable regular-sub of the year with Ralph Kennedy a close second.

An election of officers was held after dinner and Lyle Underwood was elected President, Dotty Whitney, Vice-President, Roy Stears, Treasurer, and Marie Yulich was appointed Secretary.

The FAA League had two women's teams and 4 gals in the "Doubles and Singles" entered in the Women's City Tournament this year. Team No. 1, which had Dotty Whitney, Artye Marx, De Loris Peterson, Rose Foster and Alice Brown as its members, we are proud to relate, tied for fifth place in the finals. Congratulations are due these gals.

This year there were over ninety persons signed up for bowling - unfortunately there were only eight teams and many were unable to bowl. Next fall there will be twelve teams and the League is looking forward to more bowlers and more fun during the coming bowling season. The League will bowl at Pla-Mor Bowl on Friday nights at 6:30 p.m. and will take over an entire floor with lots of seats available for visitors.

The Bowling Banquet was the League's fond farewell to bowling for awhile but we hope to see more of our personnel and their families next fall for an even bigger and better bowling season.

PICNIC

Remember that the Employees' Association has planned the annual picnic for the Regional Office personnel in Budd Park on June 18.

As in the past there will be games and contests for young and old with prizes, and loads to eat including the proverbial barbecued beef, ham, hot dogs, beans, etc.

SEE YOU THERE.

THE LAST FRAME - President of the R.O. Bowling League, Tom Davis, seen above presenting awards at the bowling banquet.

The happy contestants and friends were there to haul away the trophies and divide the loot.

Prexy Tom Davis, left, presenting team award to the Voodoos. Left to right: Del Ulstad, Captain, Charles Bevis, Mable Bevis, Claude Roper and Hal Phalp.

IT PAYS TO STAY

Part of 32 of General Services employees who received Length-of-Service pins recently from B.G. Braithwaite. A total of 540 years was represented by these faithful few.

SENIOR MEMBERS - B.G.Braithwaite (20 years) pinning 25-year pin on Catherine Handibode. Others, left to right are Leon C. Wright (20 years); Glen C. Kimsey, (20 years); K.P.Rankin (25 years); and Lola B.Wade (20 years).

MORE BOWLING

Marie Yulich, high series, and De Loris Peterson, high game winner. Missing from the photograph were Marion Strickland, men's high game, and Earl Riney, high for the series.

MEDICAL MEMOS

REGIONAL MEDICAL OFFICE

MEDICAL RESEARCH CENTER

The boundary markers of the FAA Aeronautical Center stretched from Will Rogers Field at Oklahoma City southward this month to the former Naval Air Technical Training Center at Norman.

The FAA, through Doctor Robert T. Clark, Director of the new Civil Air Medical Research Institute, announced that temporary headquarters for the Institute would be set up at the old NATTC area.

Work already has started on the remodeling of the administration building and the construction of laboratories and other buildings at Norman. The Civil Air Medical Research Institute will operate out of the Norman buildings for about 18 months. Plans call for the construction of a permanent multi-million dollar Medical Center at the Will Rogers Aeronautical Center.

Some 18 professional people are on hand now. The staff will be increased to about 150 in the next two years.

Director Clark is a biologist and physiologist. One of his recent responsibilities was preparing the monkey, Sam, for that 55-mile ride into space aboard the Project Mercury capsule. That successful flight took place in December.

The 43-year old scientist has been head of the U.S.Air Force Aerospace Medical Center at San Antonio, Texas.

Clark and his staff - many came with him from the Air Force Medical Center - hope to begin research at Norman within a few weeks on such problems as pilot fitness at various ages; the survival and protection of airline passengers forced down in the Arctic or desert.

On the question of survival and protection under extreme conditions, tests will be carried out under conditions that simulate - almost to the degree of temperature - the actual survival factor of extreme cold or heat. Tests have already been carried out on the endurance of the human body in sub-zero temperatures and under temperatures that climb as high as 130 degrees.

What happens to the pilot's senses if his oxygen fails? That's an old story and a well-known one. The pilot blacks out above certain altitudes. The Civil Air Medical Research Institute plans to continue experiments in altitude research; conditioning subjects to the art of living at altitudes of fourteen thousand feet or even higher. Doctor Clark recalled some past experiments along this this line. He mentioned a fifty-five year old man who had been conditioned to live at an altitude above fourteen thousand feet. In a pressure chamber test the man was able to perform nearly normal functions at an altitude of nearly thirty thousand feet for over an hour. The normal man, accustomed to sea level pressure, blacks out in just a few seconds.

The question of pilot reaction time will also be one of the problems Clark and his group will study intensely. In this jet age...pilots need almost superhuman reaction time to be able to cope with the nervous strain of flying at extreme altitudes and at speeds when an object in the sky can be upon a fast-traveling plane quicker than the eye can relay the message to change course. That will be one of the problems to be studied.

Need a pill to take
To cure an ill or an ache?
Need a band-aid to use
On a cut or a bruise?
In Room 111, you can see the Doc
He'll "first aid" you on the spot.

"DEATH-LESS" DRIVING

IS YOUR RESPONSIBILITY

The use of the highway is a cooperative - not a competitive matter. When you meet the uncooperative, do not compete. Concede the right-of-way and make any other concessions that may prevent an accident.

Because we have no control over the unpredictable actions of other drivers or pedestrians nor over unexpected conditions of weather and road, we must develop driving habits that are a constant defense against these hazards. This is defensive driving - a constant aid in achieving "Death-less" driving.

A look at the national record of accidents reveals that not one of these millions of accidents was intentional. They happened, not only to inexperienced and heedless operators, but to thousands of safe and sane drivers. They happened in spite of desperate efforts to avoid them at the last moment - when it was too late to start avoiding an accident.

It is the personal responsibility of the driver to be so alert that he is never caught in a last-instant, futile effort to avoid an accident - maybe a painful or fatal one.

Most of us know the rules of safe driving, but how we apply them determines whether or not we will return safely. Each week 700 Americans lose their lives in auto accidents. These lives can be saved with "Death-less" driving.