AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

September 1956 • 35c

Manpower in the Jet Age

☆ SPECIAL REPORTS TO ☆

AFA'S Tenth Annual Convention

BY

- **HON. DONALD A. QUARLES**
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- **GEN. NATHAN F. TWINING**
  Chief of Staff, United States Air Force
- **HON. JAMES H. DOUGLAS**
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  Commander, Air Materiel Command
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2877

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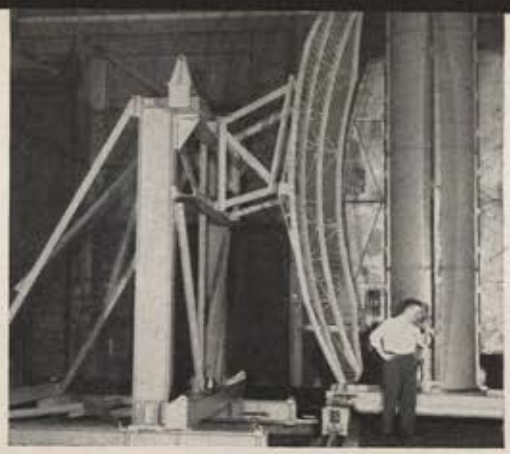

COMMUNICATIONS

HYPERSONICS

At General Electric, George F. Metcalf reports:

New Department to Help Solve Complex Defense System Problems

GEORGE F. METCALF, is General Manager of General Electric's new Special Defense Projects Department, located in Philadelphia, Pa. Mr. Metcalf has had extensive management experience in the military electronics field, both in Government Service and in the General Electric Company's Electronic Division.

Realizing the increased complexity of some of the nation's current defense system problems, General Electric has formed the Special Defense Projects Department. The new department will act as a Company focal point for large, highly complex missile projects. Headquarters for the new department will be located near Philadelphia, Pa. This new department has responsibility for large defense systems that require the combined research, development, and manufacturing resources of many of General Electric's operating departments and laboratories.

Manned by a highly skilled engineering and development staff, the Special Defense Projects Department relies upon General Electric operating departments and laboratories for many specialized phases of its defense projects.

The Special Defense Projects Department is making significant contributions to America's defense program by focusing the wide range of specialized talents of General Electric on highly complex defense system problems. Section 224-4, General Electric Co., Schenectady 5, N.Y.

ENGINEERS: G.E.'s Special Defense Projects Department is currently expanding its staff of highly skilled engineers and scientists. If you have a background of successful, creative engineering send your qualifications to: Mr. George Metcalf, 3198 Chestnut St., Special Defense Projects Department, General Electric Company, Philadelphia, Pa.

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'Tops in Every Way'

Gentlemen: When each issue does its derndest to outstrip the one before it, it's kind of difficult to say that any one of them is more outstanding than the others. But that's my sentiment, nevertheless, about this most recent masterpiece.

Your staff must share honors and congratulations on a Tenth Anniversary issue that really is tops in every conceivable way.

That T-2 story is a dilly. John Macready was Scoutmaster of our troop in Dayton when it happened and we were fortunate enough to be among the few who got the story informally and first-hand.

Joseph E. Lowes, Jr.
Director of Public Relations
Pratt & Whitney Co., Inc.
West Hartford, Conn.

'Top Drawer Stuff'

Gentlemen: I have just received my August issue and want to thank you again for the splendid way in which you present my articles. I hope the true story of the first non-stop transcontinental hop proves as interesting to your readers as it has always been to me.

Congratulations on a fine Anniversary issue! There is a wealth of top drawer stuff in this one.

Len Morgan
Dallas, Tex.

A Base Canard

Gentlemen: As a member of both the Air Force Association and the Aviation Writers Association, and as General Manager of the Biloxi Chamber of Commerce (an Air Force town), I want to congratulate you on the wonderful 300-page August issue of AIR FORCE Magazine. The entire staff should be proud of the Tenth Anniversary issue. It makes me feel as though I were back on duty.

I have one slight suggestion to make and this is from the Biloxi angle. On page 180 you mention Keesler Air Force Base as being "2 mi WNW of Biloxi." Actually, Keesler is within our city limits and its seven major gates enter and open into Biloxi. Several years ago I came across the two-mile matter while serving on General Harper's staff at ATC directly under another friend, Col. Russ Tarvin. I thought I had the matter straightened out but apparently headquarters Public Information is still carrying this mistake which is of no serious consequence, but at the same time is important since we are proud of the base and proud to have it within our city limits.

We gave valuable property in 1940 which included three golf courses, small airport, city park, and other installations to the Air Corps of the War Department for what has become Keesler. We are happy that we did not wait for the bombs to drop at Pearl Harbor before we got into action.

Anthony V. Ragusin
Biloxi, Miss.

'One of the Best'

Gentlemen: The August issue, incidentally, is one of the best you've done, not because it carries my story, but because of its variety. I think the "Black Area" illustration was very appropriate. Have heard good comments thus far, but expect the tech order minds will have comments.

Maj. Grover Heiman, Jr.
March AFB, Calif.

Utah Wing Symposium

Gentlemen: Your article "The Community in the Jet Age" (August 1956) very rightly pointed out AFA's leadership in attempting to solve the air traffic and noise problems confronting the nation in the Jet Age. However, in the interest of correcting the record the following facts and figures are herewith submitted:

The Airpower Symposium conducted by the Utah Wing in Salt Lake City on January 27 and 28 was not devoted so much to traffic and noise problems as it was to Air Age Education. The problems discussed at our conference were those dealing with the educational needs of the Air Force, the aircraft industry and the nation in general as we enter the Air Era. Likewise, the figure of 425 cited as attending was erroneous. At the Kick-off Luncheon at which Maj. Gen. Orvil Anderson (Ret.) was the featured speaker, 625 persons were in attendance. The Industrial Symposium which followed attracted over 250 persons and the Educational Symposium the following morning found over 150 persons in attendance. At the Educational Luncheon on January 28, Dr. Ronald A. Spaulding, New York University, spoke to 260 guests and Maj. Alexander P. deSeversky addressed 425 persons at a banquet the same night. In addition, the Air Force and Industry exhibits which were set up at the Rainbow Rendevu Ballroom in downtown Salt Lake City attracted over 7,000 persons during the two-day period. The Variety Show on January 27 featuring talent from the Air ROTC units of Utah played to 2,000 guests and the Airpower Ball on January 28 at which "Miss Utah Airpower of 1956" (Helen Daines) was crowned attracted 2,500 persons. (These last two figures are considered in the 7,000 to visit the exhibits.) All in all, somewhere in the neighborhood of 10,000 individuals were exposed to the aims and objectives of the AFA during the Symposium, a far cry from the 425 cited in your article. We hope to double the number in 1957.

We are proud of what we presented and the above information is fur-

(Continued on page 7)

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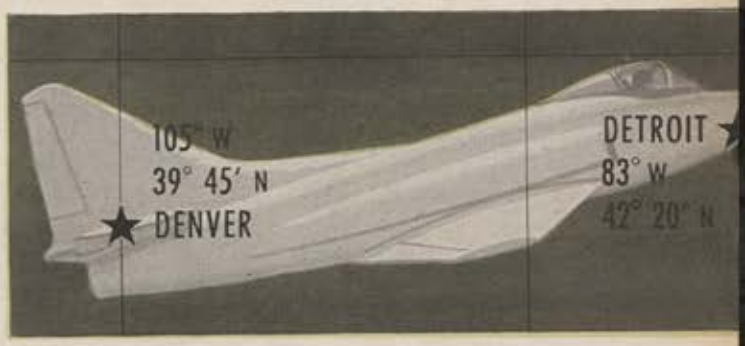

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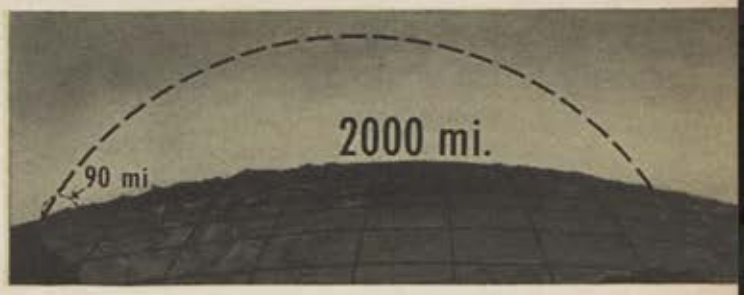

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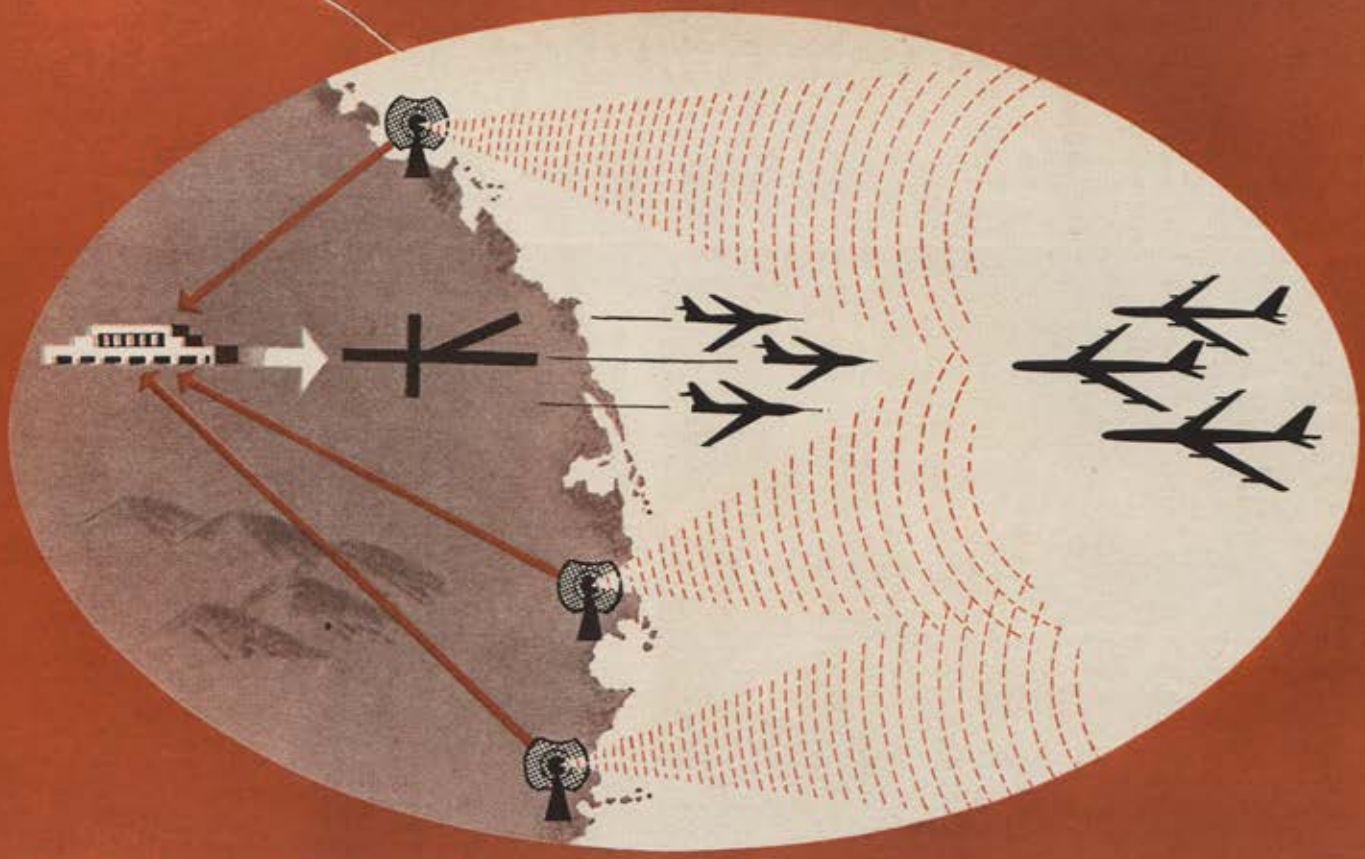

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nished not to quarrel with your article but to show other AFA units what can be done and to give them something to shoot at. I can attest to all the figures because I had to pay the bills.

Joseph C. Jacobs
Commander, Utah Wing
Kaysville, Utah

Semester Hours

Gentlemen: The article in your Tenth Anniversary edition entitled "The Air Force Academy After a Year in Business" was most interesting. However, I am sure that the country's educators were both amazed and alarmed to learn, in the answer to the first question, that the Academy curriculum has been reduced to sixty-five semester hours. As you doubtless know, the normal requirement for graduation from an accredited four-year college is 120 semester hours, which is thirty semester hours each year. Some schools have upped this to 124 and some even higher.

I am sure somebody lost a sizeable "slug" of semester hours in the course of editing the article and that what authors Miller and Wright really meant was that the number of semester hours in the Academy curriculum devoted to the social sciences and humanities had been reduced from eighty to sixty-five semester hours. In addition, it is my understanding that the cadets will also receive sixty-four semester hours of instruction in scientific studies such as math, chemistry, physics, aerodynamics, thermodynamics, etc., for a total of 129 semester hours in academic subjects.

On top of this our hard-working "young cloud-whackers" will also carry forty-six semester hours in professional subjects such as military training, flying training, and physical training. Many of these will be given during the summer months. A cadet who survives this grand total of 175 semester hours, as opposed to 124 in a normal college, should indeed have, in the words of the Academy Mission, "the knowledge and the qualities of leadership required of an officer in the United States Air Force" and "readiness for responsibilities as a future Air Commander."

Lt. Col. J. J. Caulfield
Wright-Patterson AFB, Ohio

• *Authors Miller and Wright report that the "sizeable slug of semester hours" got trapped in their tape recorder. The answer to the first question should have specified that the reduction was for social sciences and humanities. As Colonel Caulfield says, the total comes to 175 hours, which is in effect the same as five years of schooling in four years.—The Editors.*

A letter from Daddy

TO: NARSHA PALMER

Dearest Narsha:

So you're back in the classroom, teaching nuclear physics at Bratberg Abnormal! I know you're happy, with all the tykes trooping up the hill to school, bringing you apples, candy, and home-made rutabaga preserves. Gosh knows, they must be happy, with an instructress who's 27, 100 lbs., 5', brown-eyed, brown-haired, and pretty as a new red top. Modern education is great, and one of the greatest things of all is how you discipline 'em without ever layin' a hand to their little backsides. Believe me, it was different when I was a kid. I got scars the size of flapjacks to prove it, too. So you won't think I'm still a dunce, I want to tell you a pilot NEVER gets through educating himself on the latest developments for safe, all-weather flying. This week, I've boned-up on literature Southwest Airmotive sent me about B. F. Goodrich products. Like the the age-old laws of physics, the principles of B. F. Goodrich design and fabrication always remain fundamentally true and reliable. Falltime for a pilot is De-Icer time and De-Icer is synonymous with B. F. Goodrich. I'm having SAC install the latest B. F. Goodrich De-Icers on my airplane, along with a new set of B. F. Goodrich's famous tires and tubes. Those items, plus my plane's B. F. Goodrich Rivnuts, brakes, wheels, and fire-resistant gas and oil coolant hose make me about as educated a flyin' man as there is in the sky. Back to De-Icers—there's only one model B. F. Goodrich can't top: My half-pint De-Icin' school marm. You're the cream of the crop!

Love, Daddy

SOUTHWEST AIRMOTIVE CO. • LOVE FIELD DALLAS, TEXAS

Roles and Missions

Gentlemen: My sincere congratulations on Gill Robb Wilson's excellent article "The Roles and Missions Muddle" in the July issue of AIR FORCE Magazine. I think this is the best exposition of the subject I have seen.

I have felt for a long time that we were getting further away from unification rather than approaching it, and I rather suspect that a strong resolution from the convention to the President and Congress might be very timely.

C. S. (Casey) Jones
Academy of Aeronautics
Flushing, N. Y.

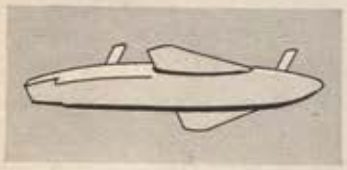
• *The text of AFA's new Statement of Policy, which appears on page 38, represents the action AFA delegates took on the unification problem at the 1956 convention.—The Editors.*

Any More AF Songs?

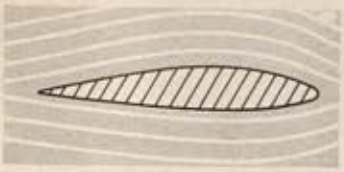
Gentlemen: This is an inquiry for the

(Continued on following page)

Now even the ice- and snow-covered Arctic regions present no landing problems to aircraft whose design includes the Pantobase landing system. A product of Stroukoff research and development, Pantobase will permit landings and take-offs from snow, ice, sand, water and unimproved terrain, thereby extending the operational capabilities of the aircraft and reducing the need for conventional airports in many remote and previously inaccessible parts of the earth's surface.



Pantobase—When designed into an aircraft the Pantobase system enables the plane to land and take off from many types of surface without changes or additional landing equipment.



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editorial and research department of AIR FORCE. I am an Air Force veteran, Reservist, and member of AFA, currently studying folk music at Columbia University with Willard Rhodes, who is president of the Society for Ethno-Musicology. He is very interested in Sergeant Wallrich's August article, "Air Force Airs," which I showed him, and agrees with the author that Air Force songs are folk music which should be preserved. For Dr. Rhodes (and myself!), I would like to list all collections of Air Force songs, compile the songs themselves and their variants, and add those songs I know or know of.

Paul F. Melton
546 West Broadway
New York 12, N.Y.

• *If any of you readers have other Air Force songs, Mr. Melton would be glad to hear from you.—The Editors*

Not Johnny Johnson After All

Gentlemen: Your August edition is truly a wonderful one. I especially liked the article by General Twining about his trip to Russia, "Yanks in the RAF," and "The Bells Will Ring Again." This latter effort is very worthwhile. However, on page 45 I think the rank of Johnny Johnson should be at least an Air Commodore (one thick stripe around the sleeve).

E. T. Sykes, ex-RAF
Miami, Fla.

• *On checking the rank of "Johnny Johnson," shown with Tex McCrary and Jinx Falkenburg on page 45, we discovered that this wasn't a shot of the 1948 Convention Wing Ding after all, but an example of still another activity AFA takes part in. The photo was taken in 1951 at the three-day reunion of the Royal Canadian Air Force Association, held in Ottawa, Canada, to which AFA representatives were invited. As she had done at the Madison Square Garden show three years earlier, Jinx lobbed autographed tennis balls into the audience of 3,500. The man we identified as Johnny Johnson is really Air Vice Marshal Frank Waite, RCAF.—The Editors.*

Soup on the Ramp

Gentlemen: Just a note to say that the August edition of AIR FORCE was great, but just to mention one article which I thought was the greatest—"Sir, The Soup Is on the Ramp."

Also, would like to see more articles on famous historical flights.

Bill Gumbko
Richmond, Mich.

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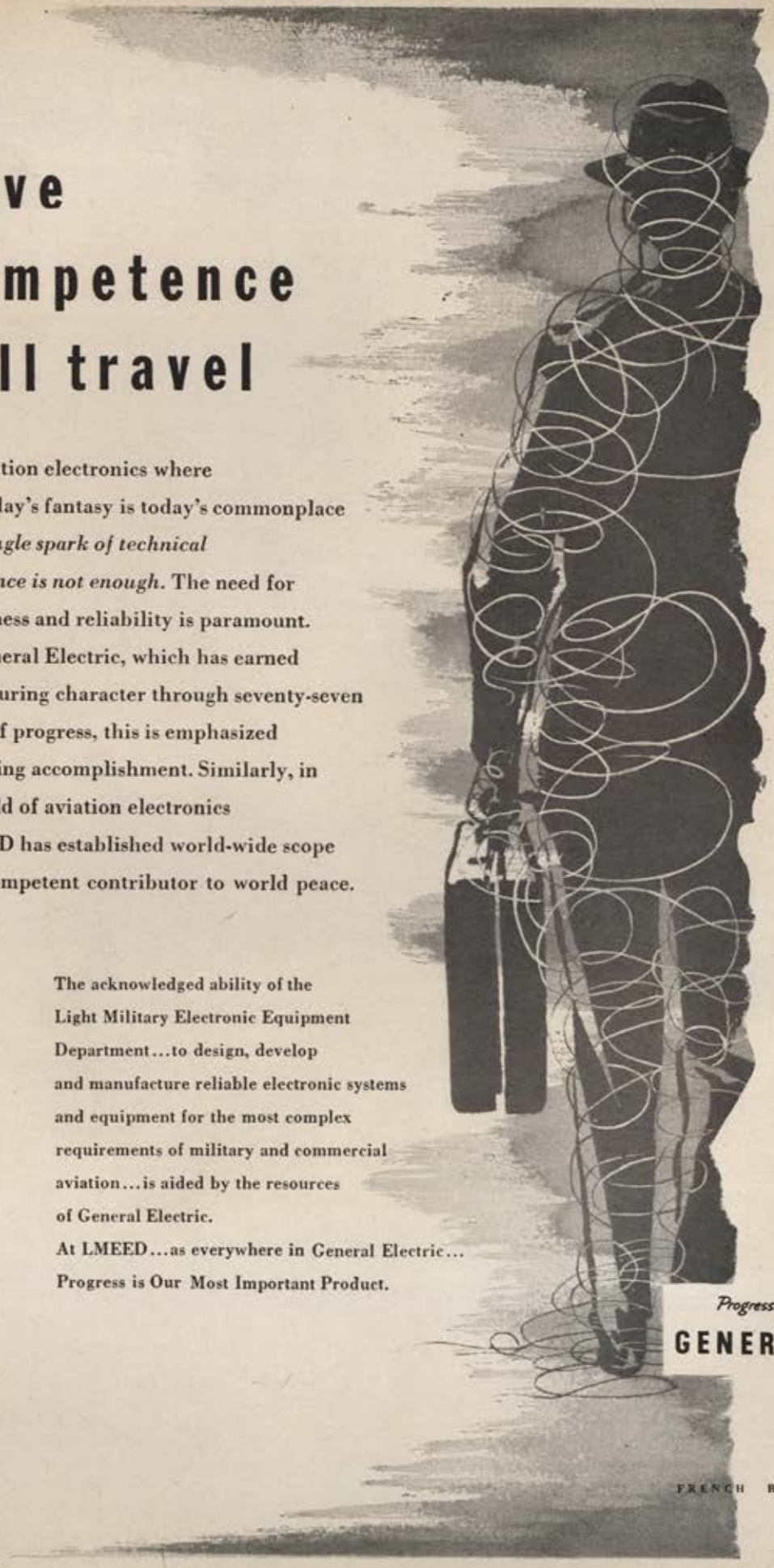

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AIR FORCE

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Turboprop transports with set records on

THE LOCKHEED YC-121F, powered by four Pratt & Whitney T-34 turboprop engines, is the world's fastest propeller-driven transport. The aircraft cruises at 420 mph.

A PRATT & WHITNEY AIRCRAFT T-34 turboprop engine is loaded aboard a YC-97J Boeing Transport.

MATS COMMANDER Lt. General Joseph Smith cites the engine's record: "My Continental Division reports that these power plants require considerably less maintenance than that required for any of our larger transport engines in common use. This remarkable record forecasts the fine service we can expect from the Douglas C-133A transports which will soon be in MATS operation." Pratt & Whitney Aircraft is most grateful for the magnificent accomplishments of MATS which are contributing very substantially to the success of the T-34.

PRATT & WHITNEY AIRCRAFT
DEPENDABLE ENGINES

T-34 engines MATS World Routes

6000-horsepower T-34s show their stamina in Boeing and Lockheed transports

The Military Air Transport Service is already using Pratt & Whitney Aircraft T-34 engines in Boeing YC-97Js and Lockheed YC-121Fs on its world routes. This engine also powers the Douglas C-133A, the highest payload production transport ever to go into service.

The outstanding service performance of the T-34 engine is another example of Pratt & Whitney Aircraft's continuing leadership in design, development and production of dependable engines.

New records include—

- A Lockheed YC-121F flight from over Gander, Newfoundland, to abeam of Shannon, Ireland, in 4 hours and 13 minutes.
- Boeing YC-97J round trips from Texas to Germany and Japan, the first turboprop transport flights across both Atlantic and Pacific.
- A new in-service MATS record, set when two YC-97Js flew a total of 46 hours and 35 minutes during a single 24-hour period.

EACH BOEING YC-97J has accumulated over 1000 flight hours and their engines are already operating over 500 hours between overhauls. These aircraft have maintained 6.1 hours daily utilization during a single month, demonstrating the reliability of the airframe, propeller, engine combination.

PRATT & WHITNEY AIRCRAFT

Division of United Aircraft Corporation • Main Office and Plant: East Hartford, Connecticut
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wing tips

By Wilfred Owen

Willow Run Airport, serving Detroit, is owned by the University of Michigan.

• • •

A British Overseas Airways hostess recently won the distinction of completing a million miles of flying between New York and London. Her greatest ambition: to make the same trip by ship.

• • •

Sky advertising has made its debut in Tokyo. A smoke screen is spread by helicopter, and then a giant projector flashes pictures and words ninety feet high about a mile off the ground.

• • •

Closed circuit television is used by the engineering department of the Douglas Aircraft Company to sample-check engine parts being produced nearly a mile away.

• • •

Canadian Pacific Airlines has introduced something new in family plan transport. On a recent polar flight from Vancouver to Amsterdam, the DC-6B aircraft was operated by three members of the same family—the captain and his twin sons.

• • •

The world power-driven model aircraft contest recently held in England was won by Great Britain. The champion team, with 2,598 points, beat the United States by 140 points. The Netherlands was third.

• • •

If the largest cargo plane now in production were parked on a football field with its nose on the goal line, it would extend to within two feet of the fifty-yard line. Its wings would reach ten feet over each side line.

• • •

American Airlines in 1955 became the world's first air carrier to fly 7,000,000 passengers in one year.

• • •

US helicopters flew 1,152,000 miles in 1955.

• • •

The average cost of traveling one mile by air is 6.7 cents on international carriers, 5.3 cents on first-class domestic flights, and 4.4 cents on coach flights.

• • •

Last year the domestic airlines of the United States accounted for fifteen percent more travel than intercity bus.

• • •

During the twelve-month period ending June 1955, 1,177,000 people arrived in the United States from other countries by air, and nearly seven out of every ten came by American flag carriers. Coach traffic was double the volume of first-class traffic.

• • •

The latest type transport plane now flying the Atlantic can carry 40,000 passengers a year between New York and London.—END

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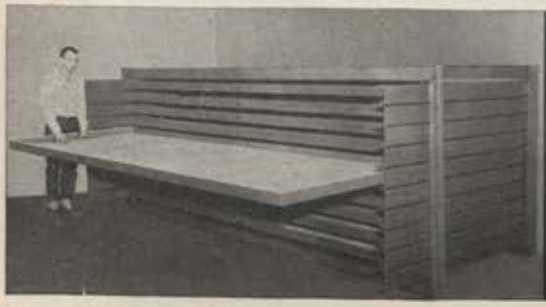

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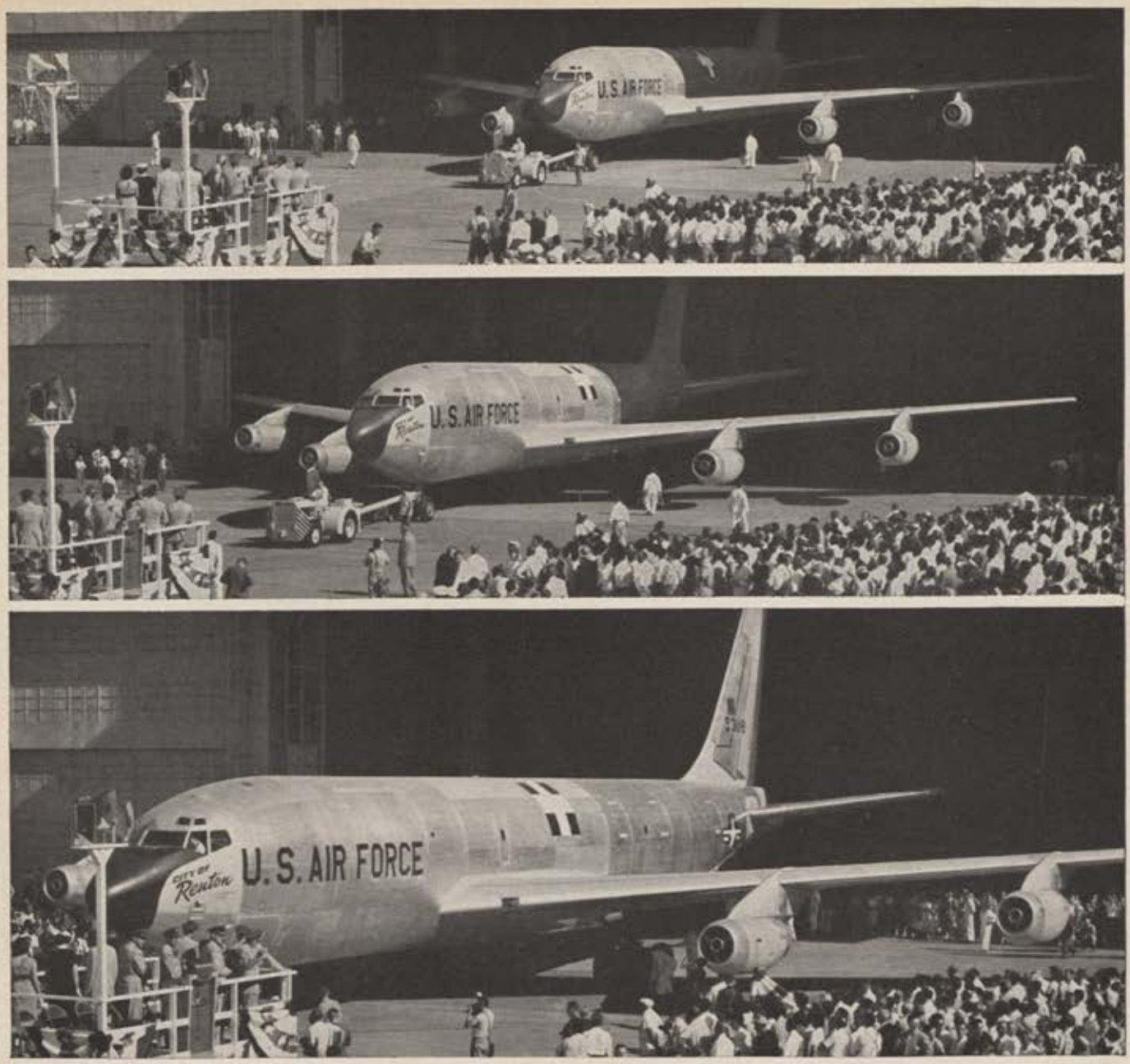

Here comes America's first jet transport-tanker

Rolling majestically off one of the production lines at Boeing's Transport Division plant is the nation's first jet transport-tanker, the KC-135.

This revolutionary new type of aircraft gives the Air Force a tanker that matches the performance of today's jet-age bombers and fighters, enabling them to refuel at the speeds and altitudes at which they operate most efficiently. The KC-135 is also the first transport geared to the defense demands of the jet age.

As the first KC-135 rolled out into the sun, the 888th KC-97—last of Boeing's piston-driven airplanes—came off another line in the same plant. Thus, during its 40th anniversary year, Boeing leaves behind the age of piston-powered aviation. The company, a pioneer in jet-flight development, is now devoting its facilities to building jet aircraft exclusively. In addition to the KC-135, its jet production includes the 707 commercial transport, the eight-jet B-52 and the six-jet B-47 bombers.

Although the first of its kind, the KC-135 is a proven aircraft, backed by over two years of intensive flight testing of a prototype model. It incorporates refinements that could grow only out of actual flight testing. In addition, Boeing's unique experience with a prototype model helped cut production time on the first KC-135 by 20%.

The first jet transport-tanker comes logically from Boeing. For this company has designed and built more large, multi-jet aircraft than any other organization in the world, and pioneered and developed aerial refueling. The new KC-135 takes its place in the line of illustrious Boeing aircraft which have, over the past four decades, helped America initiate new eras in both commercial and military aviation.

BOEING

AIRMAN'S BOOKSHELF

German author Gerd Gaiser, former *Luftwaffe* pilot, contributes the latest air war novel in American print. *The Last Squadron,* translated by Paul Finley (Pantheon Press, $3.50), is the story of a German fighter unit based somewhere along the North Sea coast in the final days of the once-mighty Nazi Air Force. Drawing on experience, Gaiser tells how the great Allied air victory looked from the other side. The story begins during the relatively peaceful days (for the *Luftwaffe*) of allied air build-up. As Flying Fortresses increase their penetration of the continent in depth and numbers, the "routine" operations suddenly become emergency. The Group's veteran pilots, mixed with tyros just out of training, valiantly sweep into the huge formations. And although their victories are many, they find themselves completely overwhelmed. Even suicide missions fail to turn back the air offensive that is rapidly laying waste their homeland. Within this setting Gaiser shows the transition of the *Luftwaffe* from an élite, pampered, invincible corps to a completely demoralized and defeated force. This is an interesting novel that takes you inside Nazi fighter operations and unveils some of the universal characteristics of the men who fight in the air.

Many of you Burma vets, especially former AF glider and troop-carrier pilots, will enjoy reading about the life of Maj. Gen. Orde Charles Wingate, the man who planned and commanded the first successful military action against the Japs in East Asia. *Gideon Goes to War,* by Leonard Mosley (Scribners, $3.50), is a biography of this guerrilla genius.

Tuskegee Airmen: The Story of the Negro in the US Air Force, by Charles E. Francis, 1st Lt., USAF Reserve (Bruce Humphries, Inc., $5), adds a chapter to the history of the USAF and the story of the American Negro. Starting with the first graduation of five Negro pilots into the Army Air Force on March 7, 1942, the author weaves a detailed account of the accomplishments of Negro airmen in the 99th Fighter Squadron and the 332d Fighter Group, Twelfth and Fifteenth Air Forces in Europe. He describes events surrounding the development of Tuskegee Army Air Base as a training center for Negro pilots. A fairly objective book, *Tuskegee Airmen* is laced with descriptive stories of combat air actions and includes rosters of pilots killed and missing in action, DFC winners, and complete combat air summary of the Tuskegee grads.

One of the most practical volumes the AF has published recently is the *United States Air Force Dictionary,* edited by W. A. Heflin (Air University Press, $3, for sale by the Superintendent of Documents, US Government Printing Office, Washington 25, D. C.). This hard-cover volume contains 16,500 entries—words and terms that are now an accepted part of AF language and thought, or, are related in some significant way to the operational, scientific, and technological world of aviation, the USAF, and military airpower. Because of special usage each entry is defined with respect to the AF's own operations and to the English language as a whole. Like any first edition, this compilation (which took more than five years as a special Air University project) no doubt contains some inaccuracies. The end-papers carry directions for submitting suggested changes, additions, and corrections for a possible next edition. The *Dictionary* is a worthwhile contribution to air literature and the most complete reference book of its kind to date.

In the technical field two British books now in American cover add to the growing list of works on missiles and rocketry. *Frontier to Space,* by Eric Burgess (The Macmillan Company, $4.50), traces the growth of man's knowledge of the regions above the troposphere. The author explains in detail how great advances in this knowledge have been made through rocket and missile experimentation. *Rockets and Guided Missiles,* by John Humphries (Macmillan, $6), is a survey of present-day achievements, with half the volume devoted to propellants, motors, and components, and half to application of these motors to aircraft and missiles. Both volumes are designed for the engineer, technician, and student, but the layman with curious interest in this field will find them good reading.

We'd heard a lot about a brand new *Air Force Handbook,* by Vernon A. Ouellette (Fearon Publishers, $3.90), billed as a textbook for basic trainees, Reservists, and active-duty airmen—an "Air Force bible" and gold mine of information dug from bales of regulations and official publications. So we got a copy and took a look. This highly touted, official-looking 499-page paper-back contains innumerable factual inaccuracies, copious quantities of out-of-date material, and worse, whole sections of just plain "wrong" (as well as incomplete) information about the Air Force, its organization, administration, operations, and equipment. Although the preface acknowledges that Air Force people helped the author, the Air Force has had nothing to do with this book, does not endorse or approve it. Neither do we.

The production and manufacturing techniques of modern aircraft industry come under careful scrutiny in *Aircraft Production Methods,* by Gordon Ashmead (Chilton Company, $7.50). This is a description and analysis of the production methods used in developing design into production, from light airplanes to heavy transports and bombers. A valuable reference manual for production engineers.

Last month we told how all AF people as well as members of the AF Reserve, ANG, AF-ROTC, and civilian students and faculty of AF schools can get air books at discount from the Air University Book Department, Maxwell AFB, Ala. We listed thirteen volumes and their special prices. Here are some more recent ones we recommend, also available from the AU Book Department. The special prices include postage:

The Long Night, by Martin Caidin. Fiction, the story of an A-bomb attack on a modern American city (Dodd, Mead—$2.45).

Roll Back the Sky, by Ward Taylor, Lt. Col. USAF. A novel centered around the B-29 operations in the Pacific, WW II (Henry Holt—$3.15).

Zero, by Martin Caidin. The Pacific air war as told by two former Japanese naval air officers (E. P. Dutton —$3.90).

Forbidden Area, by Pat Frank. Novel of Soviet attack on the US. (J. B. Lippincott—$2.80).

Miracle of Merriford, by Reginald Arkell. A novel about an AF unit station in rural England (Reynal—$2.45).

Survival In The Sky, by Charles Coombe. The work being done on human factors problems in modern jet flight (W. R. Morrow—$2.95).

The Direction of War, Air Vice Marshal E. J. Kingston-McCloughry. Study of command in war, emphasis on airpower (Praeger—$3.80).

Brainwashing: The Story of Men Who Defied It, by Edward Hunter (Farrar, Straus and Cudahy—$2.80).

Zoomies, Subs and Zeroes, by Vice Admiral Charles E. Lockwood, USN (Ret.) and Col. Hans Christian Adamson, USAF (Ret.). Submarine rescues of downed airmen, WW II (Greenberg—$3.20).

Soviet Airpower, Richard E. Stockwell. Presentation and analysis of Russian airpower (Pageant Press—$5.70).

Rush service to the top of the world!

On watch 24 hours a day, DEW (that's *D*istant *E*arly *W*arning) will probe the polar sky with radar. The DEW line will stand between *you* and a sneak attack over the top of the world.

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Big enough to swallow a tank, truck or a giant bulldozer. The C-124 moves cargo in quantity *so far and so fast* that logistics experts can plan smaller stockpiles—and less material en route in slower "pipelines." That results in stretching defense dollars farther. And the Douglas C-124 also doubles as a troop transport, hospital ship, repair shop or flying office.

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Development of the Douglas C-124 drastically simplifies supply problems. Specialists and material are never more than hours from any point on our defense perimeter. But good men are always needed. There's opportunity *for you* with the Air Force. Find out about it today!

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Best view of an angel

Many people, expecting a different angel, have seen this one from chin deep in water, from a storm-tossed raft, a sinking boat, or from a stretcher on the edge of a frozen Greenland fjord. Who these troubled people are, or where in the world they come from matters not. All that matters to the USAF Air Rescue Service is that they are in distress. Even weather matters little to these airforce men who have dedicated their lives to others. To make a rescue, they have often landed in water so rough, they were forced to

taxi their Grumman SA-16 Albatross back to shore, once through 12 miles of 10 foot high waves.

In the world today, 44,250 people are living proof of the Air Rescue Service motto: *That Others May Live*. To these people and their kin, the USAF has demonstrated that the United States is a good neighbor and friend.

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Designers and builders of the supersonic F11F-1 Tiger, Transonic F9F-8 Cougar, S2F sub-killer, SA-16 Albatross rescue amphibian, metal boats, and Aerobilt truck bodies.

collision attack*

This dramatic photograph with its perfectly etched pattern against the blue sky of mid-summer illustrates the split-second successful interception of an RCAF defender CF-100 against an enemy raider. RCAF squadrons across Canada, equipped with AVRO CF-100's, carry out these precise exercises as part of their daily task of round-the-clock alert.

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* AIRCRAFT — CF-100's
HEIGHT — 35,000 feet
DEFENDER — Flying from upper right to lower left
RAIDER — In actual combat the raider would have been destroyed at X, the point of interception
The ragged trail background is from a previous interception

AIRPOWER IN THE NEWS — By Lee Klein

■ The **Air Force and the Navy shared top honors** at the **National Aircraft Show in Oklahoma City, Okla.,** over the Labor Day weekend. The AF's **Capt. Manuel J. Fernandez, Jr.,** won the **Bendix Trophy** event by flying an F-100C Super Sabre 1,120 miles from George AFB, Calif., to Oklahoma City in one hour, forty minutes, and 38.8 seconds at an **average speed of 666.661 mph.** Captain Fernandez is Assistant Group Operations Officer of the 413th Fighter-Day Group, George AFB, and, with fourteen and one-half kills to his credit, he is the **second-ranking jet ace** of the Korean war (the late Capt. Joseph McConnell was top with sixteen kills). All six of the entrants in this year's event flew **North American F-100Cs** and all six of them **bettered the old record** of 616.208 mph set by Capt. Edward F. Kenny in 1954 in an F-84F Thunderstreak.

The **Thompson Trophy** was presented to **Navy Cmdr. R. W. "Duke" Windsor** on the final day of the three-day show for his flight of 1,015.428 mph in a **Chance Vought F8U-1 Crusader** on August 21. The flight was made over a 15.1-kilometer course over California's Mojave Desert and marks the first time the top speed for the event was more than 1,000 mph (last year, the Thompson Trophy was won by Col. Horace A. Hanes with a speed of 822.135 mph—*see below*). The mark is well below the more than 1,900 mph record for manned aircraft set in a Bell X-2 rocket research plane by Lt. Col. Frank K. Everest last July (*see page 82*).

Col. David C. Schilling, World War II ace and holder of the Harmon Trophy, was killed in an auto crash in England in August. In 1952 he was awarded the AFA Flight Trophy.

AF Chief of Staff Gen. Nathan F. Twining congratulates T/Sgt. William G. Sutherland who has just received the Cheney Award for 1955 for his heroism in a plane crash. His wife and parents look on.

Col. Horace A. Hanes receives the Mackay Trophy for 1955 from General Twining for his world record flight of 822.135 mph in an F-100C last year.

Other highlights of the show, which attracted 151,293 persons over the three-day weekend:

● An **Army Bell H-13 helicopter** flew for **fifty-seven hours and forty minutes** during the show, breaking a **helicopter endurance record** of thirty-one hours, forty minutes which was set—also by the Army—only a little more than a week before.

● The **Allison Trophy** was won by a team from the Flying Training AF at Webb AFB, Tex., led by **S/Sgt. Eugene F. Bleckler,** who removed an **Allison J-33** turbojet engine from a T-33 trainer and replaced it with a new J-33 engine in eight minutes and 13.8 seconds. Last year's winners, in the event that spotlights the role of the airman-mechanic in the maintenance of our aircraft, were also from Webb AFB.

● The **General Electric Trophy** was won by an AF B-47 jet bomber which flew the 1,900 miles from Bermuda to Oklahoma in three hours, eight minutes, and 43.6 seconds at an average of **601.187 mph.** It was piloted by Maj. Joseph Schreiber of Brooklyn, N. Y.

■ Last year's winner of the Thompson Trophy (*see above*), **Col. Horace A. Hanes,** has been awarded the **Mackay Trophy for 1955** for his flight of 822.135 in an F-100C on August 20, 1955. Colonel Hanes, who received the **Thompson Trophy** for the flight at the 1955 National Aircraft Show in Philadelphia, is director of flight test for

(Continued on following page)

AF Secretary Donald A. Quarles pins the Distinguished Service Medal on Lt. Gen. Hubert R. Harmon who is retiring from the AF and his position as AF Academy Superintendent.

New Dean of Faculty at the USAF Academy, Col. Robert F. McDermott. He has been a faculty member at the school since it was established, and before that taught at the US Military Academy where he is a graduate.

the USAF Flight Test Center at Edwards AFB, Calif. The Clarence Mackay Trophy—one of aviation's most coveted—has been **awarded annually since 1912,** usually for speed, endurance, high altitude, or long distance flights. In the past, it has gone to such persons as **Gen. H. H. "Hap" Arnold** and **Eddie Rickenbacker.** The latest recipient, Colonel Hanes, is forty years old and a native of Fayette, Ill. He entered the AF in 1938 and during World War II flew thirty combat missions in P-38 fighters in Europe where he was shot down over enemy territory but evaded capture and made his way back to allied forces.

■ Two recently retired AF generals have taken positions with industry. **Maj. Gen. Raymond C. Maude,** former commander of the AF Cambridge Research Center, ARDC, has joined the **Allen B. DuMont Laboratories, Inc.,** to assist in directing and coordinating DuMont's program of supplying electronic equipment to the armed services.

Maj. Gen. Kenneth P. McNaughton, former vice commander of the Far East Air Force has been named Director of the West Coast operations for **Fairchild Camera and Instrument Corp.** He will make his headquarters at Fairchild's West Coast plant in Los Angeles and will be particularly concerned with the company's Reconnaissance Systems Division in connection with the determination of the long-range future requirements of the military services.

■ **Capital Airlines** has ordered fourteen **British deHavilland Comet IV** jet airliners—marking the second time the US carrier has turned to British planemakers for its equipment (Capital is currently operating the British **Vickers Viscount** turboprop airliner over its domestic routes). The order boosts British prestige and gives them a toehold in the commercial transport market. They were off to an early start in the jet transport race more than four years ago when they put the Comet I into regularly scheduled service, but a couple of tragic crashes (blamed on metal fatigue) gave American manufacturers a chance to grab the lead. Before Capital can put the Comet into service—sometime early in 1959—the **Civil Aeronautics Administration will have to certify it** for airline operation in the US.

In a bid for another segment of the transport market, the British sent their **Bristol Britannia,** a four-engine turboprop plane touted as the largest commercial carrier in the world, on a tour of the US. The huge transport **cruises at 400 mph,** can climb at 3,000 feet a minute, and **can land in less than 3,000 feet.**

Brig. Gen. Andrew J. Kinney is new Director of AF Information Services, succeeding Brig. Gen. Robert L. Scott. General Kinney has been Executive Assistant to AF Secretary Donald A. Quarles for over a year.

■ **Brig. Gen. Andrew John Kinney,** executive assistant to Secretary of the Air Force Donald A. Quarles for the past year, has been named **Director of Air Force Information Services** at the Pentagon. He succeeds **Brig. Gen. Robert L. Scott, Jr.,** who has had the job for the past year and a half. Forty-two-year old General Kinney is a graduate of the US Military Academy and served as a member of the United Nations Truce Team in Korea. He served in the Pacific during World War II and is a graduate of the Army War College and the Air War College.

General Scott, best known for his book *God is My Co-pilot,* will take over command of the 3600th Combat Crew Training Wing at Luke AFB, Ariz.

■ **Col. David C. Schilling,** thirty-seven, well-known USAF fighter ace of World War II, and a pioneer of in-flight refueling technique for jet fighters, was **killed in an auto crash** in England in August. He was **Inspector General of SAC's Seventh Air Division** in England. Colonel Schilling was the first to cross the Atlantic non-stop in a jet (in 1950) when he flew an F-84 Thunderjet from England to Maine with three in-flight refuelings. During World

(Continued on page 29)

RADAR THAT PUTS THE FINGER ON STORMS

Raytheon Storm Detector Radar, the AN/CPS-9, locates storms up to 300 miles away, measures their distance, direction, height—indicates the presence of rain or snow. Storm Detector Radar was developed by Raytheon in cooperation with Signal Corps engineers for use by all military services. The "3-dimensional" picture provided by this unit is invaluable to the quick, precise forecasting demanded by modern military operations.

Civilian applications of this equipment will supply vital information to commercial airlines, power utilities; more timely forecasts to the U. S. Weather Bureau. Reliable, accurate, versatile, the Storm Detector Radar demonstrates again that Raytheon means . . . "Excellence in Electronics."

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What's New With ★ RED AIRPOWER

This month we are continuing what began last month as a regular feature of AIR FORCE*—a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor to document the information beyond the fact that the sources are trustworthy.*

★ Missiles and Subs

Several Soviet and World War II German-type submarines have been used in Russian experiments to launch guided missiles from under the surface. Most of the tests have been carried on in the Baltic Sea, with enough success to warrant a new push in the Soviet Navy to equip more submarines for underwater missile-launching. The missiles are of short- and medium-range types, with the launching device placed near the rear of the submarine.

The Russians found the basis for underwater missile launching in 1944-45 studies made by the Germans near Peenemünde. To date they have launched missiles from depths of as much as 300 feet.

★ MIK-209 Air Flow

The air mass flow of the MIK-209 turbojet engines in the TU-104 twin-jet transport and the Bison and Badger bombers has been calculated as 361.5 pounds per second.

According to official Soviet information, the two engines on the TU-104 will consume in one hour "more than 35,000,000 cubic feet of air." The de-rated thrust of these engines has been given by the Russians as 14,881 pounds each. And from this, it can be estimated that each engine has an air mass flow of 361.5 pounds per second.

★ Aluminum Production

Long a problem, aluminum production in Russia now exceeds aircraft needs by a comfortable margin. (During World War II the Soviets hastily called on the US and Canada to supply them with aluminum.) Soviet primary aluminum production under the upcoming Sixth Five-Year Plan is to be 2.7 times present output by 1960.

Currently the Russians are expanding aluminum output most rapidly in Siberia, with a large ingot plant under construction at Irkutsk (power for which will come from new stations under construction on the Angara River). Three more primary aluminum plants and six foundries reportedly are now under construction in Central and Eastern Siberia. The program is to increase aluminum production in Siberia by some 400,000 metric tons annually by 1960.

★ 'Foreign Technical Literature'

The new Sixth Five-Year Plan for the USSR calls for an "increase in the evaluation of foreign technical literature." The Soviets propose to spend larger sums on foreign trade magazines and other publications.

Even the state penitentiary at Bautzen in East Germany has been pressed into such service for the Russians. There several "intelligentsia criminals" are at work preparing excerpts and complete translations of material published in other countries. Their reports are then fanned out to Soviet technicians across the USSR.

Even the East German Air Force has its own bureau to study foreign literature. It carries the alphabetical designation "LAI."

★ Flashlights

From seven to nine regiments of the Soviet air forces have been equipped with twin-engine all-weather interceptors, NATO-designated Flashlight. Several of the twin-engine craft were shown on Soviet Aviation Day this year; fifty of the interceptors were shown last year on the same occasion.

★ New Synthetic Rubber

East German scientists have come up with a new synthetic rubber, quite suitable for aircraft tires. Heretofore, Russia and its satellites have always had to fortify their synthetic rubber production with several thousand tons of natural rubber. The natural rubber went into airplane tires, treads for tanks, and tires for farm tractors.

Now, with the new synthetic that is claimed to be ever so much better than those previously available behind the Iron Curtain, Russia apparently has achieved complete independence from outside sources.

The German scientists who made the discovery have been called to Moscow, and two large-scale production works are being planned.

★ Ski Gear for Jets

One claim to fame the Russians can quite honestly take credit for is that they were the first to put an airplane on skis. Recently they have gone a step further and put skis on jet interceptors.

Not fully retractable, the new gear extends fore and aft of the edges of the wings of some fighters.

Skis have been installed on LA-17s used as fighter protection at Arctic bases of the ADD or Long Range Flying Command, Soviet equivalent to USAF's Strategic Air Command.

★ Aeronautical Aid to China

On April 7, Russia and Red China signed a partly secret trade pact. The signing took place at Peiping, and called for industrial equipment and technical aid to China amounting to about 2.5 billion rubles. Not spelled out in the publicly announced portions of the pact were the facts that China will get a number of electronic and radio equipment works, one synthetic fuel plant, a number of power stations, and as yet an undetermined number of "aeronautical institutes."

The Russians are known to be very critical of the way the Chinese have been training pilots and mechanics to operate Soviet-manufactured flight equipment, including MIG-15s, MIG-17s, TU-4s and IL-28s.—END

HYPERSONICS...
...and the AFA

This is the business end of a hypersonic shock tunnel. And, like the Air Force Association, its big job is to "...assist in obtaining and maintaining adequate airpower for national security and world peace." Specifically, it meets this objective by obtaining data on hypersonic flight ...data which will be needed to engineer intercontinental missiles. Conceived by a Cornell Aeronautical Laboratory engineer six years ago, the shock tunnel was initially developed under a self-supported internal research program, and later by Air Force contract. Today it is a basic tool for the study of aerodynamic and heat transfer problems of aircraft and missiles of the future.

Cornell Lab is proud to concur, both in words and deeds, with the AFA's prime objective—adequate airpower. And on this, the occasion of our own tenth anniversary, we salute the AFA's first decade of growth and progress. The Association has played a vital role in helping the men and women of the Air Force keep aeronautically well-informed, in fostering an Air Force *esprit de corps,* and in providing a cohesive force among Air Force veterans. Congratulations!

CORNELL AERONAUTICAL LABORATORY OF CORNELL UNIVERSITY 1946 1956 10th ANNIVERSARY

CORNELL AERONAUTICAL LABORATORY, INC.
OF CORNELL UNIVERSITY, BUFFALO 21, NEW YORK

AFA exclusive

now for the first time you can

PROTECT

Where's last month's flight pay? If you're like most of us, you've probably spent it for current living expenses.

If you suddenly lost your flight pay, could you continue to handle your financial commitments for even a short time?

And you could lose your flight pay. Any time you can't qualify for flight status because of accidental bodily injury or disease, your flight pay stops.

Now, for the first time, you can guarantee your flight pay income against loss. AFA's new, exclusive flight pay protection plan provides up to twenty-four monthly payments at the rate reported on your insurance certificate.

IF YOU'RE ON FLIGHT STATUS SIGN UP TODAY TO PROTECT YOUR FLIGHT PAY!

YOUR FLIGHT PAY

Underwritten by Aetna Insurance Co., 670 Main St., Hartford 15, Conn.

HERE'S HOW THE PLAN WORKS FOR AIR FORCE ASSOCIATION MEMBERS

You sign up and pay an annual premium of only 1/100th of your yearly total flight pay. (Example: Your flight pay is $1,800 a year. The plan costs you 1/100th of $1,800, or $18.)

Then, if you're grounded due to accidental bodily injury or disease, our AFA Plan pays you monthly indemnity for loss of flight pay for up to twenty-four months—after a waiting period of 181 days for military aviation accidents, and after ninety days for other accidents or disease. The insurance payments pick up retroactively where the government left off.

When you go back on flight status, or at the end of twenty-four months, the payments end. But by that time, if you can't requalify for flight status, you should be able to adjust your commitments to conform to your reduced income.

All members of the US Air Force, Air National Guard, Air Reserve, and the other military services, who are on flight status and who belong to the Air Force Association, are eligible.

NOTE: Of course this protection does not apply in case of war, declared or undeclared, or hostile action, civil war, invasion, or the resulting civil commotions or riots. There are also other exclusions which may never apply to you, but you are entitled to know them. They are as follows:

Plan does not cover losses due to criminal act of the AFA member; or from bodily injury occurring while in a state of insanity (temporary or otherwise); or from officially certified "fear of flying"; or caused by intentional self-injury, attempted suicide, criminal assault committed by the Member, or fighting, except in self-defense; or from failure to meet flying proficiency standards unless caused by or aggravated by or attributed to disease or accident; or accidents caused while riding or driving in any kind of race; or by alcohol, drugs, venereal disease, arrest or confinement; or willful violation of flying regulations resulting in suspension from flying as a punitive measure; or sentence to dismissal from the service by a general court-martial, submitted resignation for the good of the service, or suspension from flying for administrative reasons not due to accident or disease or voluntary suspension. Loss of life shall not be deemed as loss for purposes of this plan.

In the event you receive the total limit of twenty-four (24) months' indemnity, your coverage is automatically terminated. You may thereafter reapply for insurance coverage in the same manner as a new Member. Coverage also ends with termination of membership in AFA, or with resignation, retirement, or pensioning from the service, or at age sixty.

This insurance is renewable at the option of the Company.

Policy Form No. 1-620-3A.

ALL MEMBERS OF THE USAF, AIR GUARD, AIR RESERVE, AND OTHER SERVICES WHO ARE ON FLIGHT STATUS ARE ELIGIBLE, IF THEY BELONG TO THE AIR FORCE ASSOCIATION.

APPLICATION FOR PROTECTION OF FLIGHT PAY INCOME EXCLUSIVELY FOR MEMBERS OF THE AIR FORCE ASSOCIATION

SEND REMITTANCE TO AIR FORCE ASSOCIATION, MILLS BUILDING, WASHINGTON 6, D. C.

NAME, RANK, SER. NO., COMPONENT (USAF, ANG, ETC.)

MAILING ADDRESS

AMOUNT OF MONTHLY FLIGHT PAY

I certify that I am currently receiving incentive flight pay.

SIGNATURE DATE

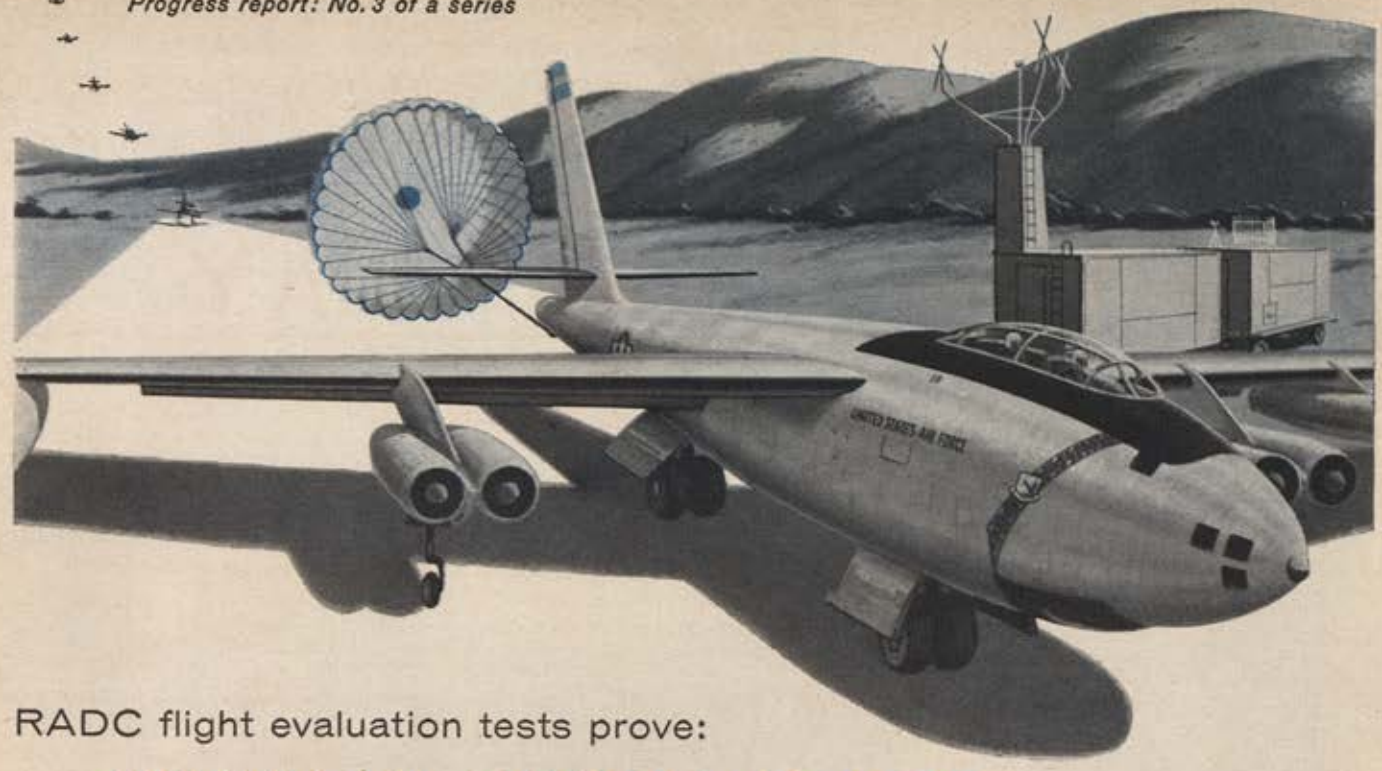
The annual premium charge is 1% of annual flight pay.

APPLICATION MUST BE ACCOMPANIED BY CHECK OR MONEY ORDER FOR ANNUAL PREMIUM.

NON-MEMBERS

☐ I enclose an additional $5 membership dues. Enroll me as a member of Air Force Association.

Progress report: No. 3 of a series



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Gilfillan Automatic GCA is building a remarkable record in Flight Evaluation Tests now under completion at Rome Air Development Center.

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In test after test with mixed jet and piston traffic, Gilfillan AGCA is providing automatic approach, airborne data for pilot control or standard GCA talkdown, to individual aircraft in the same stream of traffic.

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2. NEW BUILT-IN RELIABILITY

Commenting on the new simplified maintenance built into the Gilfillan Automatic GCA trailer, a USAF official remarks: "This simplified maintenance system is as great an advance in electronic design as Automatic GCA itself. It is clear that AGCA will surpass even standard Gilfillan GCA's high-reliability record."

Instantly replaceable subminiature electronic plug-in card assemblies, pre-tested replacement stock, check-out bench with outstandingly simplified test equipment and a built-in aircraft simulator for operational check-out combine to provide quick 1-2-3 maintenance on the spot. Only minimum maintenance training is required.

Automatic GCA, now daily piling up new records in efficient performance and reliability, is the result of ten years of joint research and development by USAF Rome Air Development Center and Gilfillan.

Gilfillan
Los Angeles

PRIME CONTRACTORS FOR COMPLETE SYSTEMS

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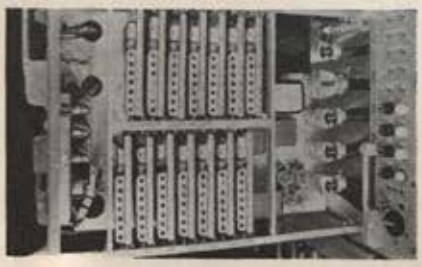

Card Construction

Aircraft Simulator

Simplified Test Equipment

War II he shot down twenty-three German planes and destroyed ten others; and the group he commanded—the 56th Fighter Group of the Eighth AF—downed a total of 804 enemy planes. A native of Leavenworth, Kan., Colonel Schilling is survived by his wife and two sons. Among his decorations are the Distinguished Service Cross, the Silver Star, the Distinguished Flying Cross, and the Air Medal. In 1951 he was awarded the **Harmon International Air Trophy** and the following year he received the **Air Force Association's Flight Trophy.** In the **April 1956 SAC Tenth Anniversary issue of** AIR FORCE, he contributed the story on SAC's fighters (see "SAC's Little Fighters and How They Grew"). His body was flown to the US for burial at **Arlington National Cemetery.**

■ STAFF CHANGES . . . **Lt. Gen. Charles B. Stone III,** Commander, ConAC, Mitchel AFB, N. Y., has been assigned additional duty as Chairman of the Military Staff Committee, US Delegation, United Nations. . . . **Maj. Gen. Samuel R. Harris,** Commander of the Arnold Engineering Development Center, ARDC, Tullahoma, Tenn., has retired. . . . **Maj. Gen. Wycliffe R. Steele's** assignment to the Joint Construction Agency, US European Command, has been changed. General Steele is now Chief of the Military Assistance Advisory Group in England. . . . **Brig. Gen. William P. Fisher,** Assistant Director of Operations, SAC, has become Deputy Commander, Eighth AF. . . . **Maj. Gen. Richard M. Montgomery,** Chief of Staff, Hq. SAC, is now Deputy Commander of the Second AF. . . . **Brig. Gen. James B. Burwell,** Deputy for Operations, ConAC, has retired. . . . **Brig. Gen. Edwin B. Broadhurst,** Commander of the 57th Air Division, has replaced **Brig. Gen. David Wade** as Inspector General, Hq. SAC. General Wade is now Chief of Staff, Hq. SAC. . . . **Brig. Gen. John C. B. Elliott,** Chief of ConAD Liaison Team, has retired. . . . **Brig. Gen. John M. Breit,** Deputy Provost Marshal, has been reassigned as Deputy Director of the Joint Construction Agency, US European Command. . . . The June reassignment orders for **Maj. Gen. Walter E. Todd** have been changed to include the duty of Chief of Staff of FEAF as well as Vice Commander. . . . **Brig. Gen. Charles H. Pottenger** reported to Hq. FEAF and became Deputy for Personnel and Administration. . . . **Brig. Gen. Franklin Rose** retired on July 31. . . . **Maj. Gen. Royden E. Beebe,** Deputy Chief of Staff, Operations, Hq. USAFE, has reported to Hq. USAF for duty as the AF Member of the Joint Strategic Survey Committee, Joint Chiefs of Staff. . . . **Brig. Gen. Nils O. Ohman,** Commander of the 3d Air Division, will become Commander of the 19th Air Division, SAC, in October. . . . **Maj. Gen. John R. Gilchrist** is now Assistant Comptroller for Financial Matters, Hq. USAF. He vacated the position of Director of Finance but is still Commander of the AF Finance Center. . . . **Maj. Gen. John B. Ackerman,** Vice Director, National Security Agency, has been reassigned as Commander of the Thirteenth AF, FEAF. . . . **Maj. Gen. Walter I. Miller,** Director of Accounting, is now assigned duty as Director of Accounting and Finance, Hq. USAF. . . . **Maj. Gen. Robert F. Tate** has become Commandant of the Air War College. He was the AF Member of the Joint Strategic Survey Committee, Joint Chiefs of Staff, Hq. USAF. . . . **Maj. Gen. John F. McBlain,** Director of Personnel Council in the Office of the Secretary of the Air Force, will retire in October. . . . **Maj. Gen. Matthew K. Deichelmann,** Commandant of AF-ROTC, will serve about six months' duty as Senior Member of the United Nations Military Armistice Commission beginning in October.—END

At a highlight of the Civil Air Patrol's Ninth Annual Cadet Exchange, Maj. Gen. Walter R. Agee, left, Commander of CAP, presents CAP's "Airman of the Year" award to Lt. Col. John Paul Stapp, famed for his rocket sled tests.

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Symington Subcommittee Winds Up Investigation

Air Force testimony points up Soviet airpower gains

THE FINAL testimony released by the Symington Airpower Subcommittee added up to twenty-three volumes and almost 1,900 pages.

Of particular interest was the testimony of Chief of Staff Gen. Nathan F. Twining; Lt. Gen. Donald L. Putt, Deputy Chief of Staff, Development; and Lt. Gen. Clarence S. Irvine, Deputy Chief of Staff, Materiel, heard on July 19, following their return from Moscow.

While there was no change in the estimates of Soviet airpower and comparisons of relative strength reported previously, the three generals brought out some interesting comparisons, including these:

The Soviets possess thousands more combat planes than the United States.

The Soviets are producing more combat planes than the United States.

The Soviets have thousands more planes in combat units than the United States.

The Soviets have thousands more combat planes than the United States, even if both sides count naval aviation.

The Soviets have more Bisons than the United States has B-52s.

The Soviets' numerical superiority in Bisons will continue for at least several years.

The Soviets have about the same number of Bears as the United States has B-52s.

The Soviets will have more Bears than the United States has B-36s.

The Soviets are producing ten times as many fighters as the United States.

The Soviets are producing more jet fighters alone than the United States is producing of all types of jets.

The Soviet Badger performance is superior to that of the United States B-47.

The Soviet Bear has longer range than the B-52.

The Soviets claim they have a supersonic bomber; United States has none.

The Soviets' new light bomber is superior to present United States' light bombers.

The Soviets have outproduced the United States in modern combat aircraft during the last three years.

The Soviets produce engines with greater thrust than those of the United States.

The Soviets will overtake United States qualitatively if we continue as we are.

The Soviets are closing the strategic airpower gap.

The Soviets' all-weather fighters will make SAC's job more difficult.

The Soviets spend more resources on aircraft research than does the United States.

The Soviets may even be ahead now in new weapons development.

Of equal interest was the testimony of Adm. Arthur Radford. The Chairman of the Joint Chiefs of Staff hinted strongly that a major change in the Air Force 137-wing program was in the offing. His discussion of the size of future forces of all services seemed to substantiate the report attributed to his office, proposing substantial cuts across the board.

Other spokesmen, such as AF Secretary Donald A. Quarles, foresee decreases in manpower as missiles are added to the combat inventory. However, Admiral Radford apparently does not base his thinking on these new weapons. Admitting that missiles will have an impact on our force structures "if they can be developed to do the things that people claim for them," Secretary Quarles questioned our ability to have these weapons ready in the near future.

More startling was his curt criticism of United States intelligence. He took issue with previous witnesses, including Mr. Allen Dulles, Director of the Central Intelligence Agency. It was Admiral Radford's view that we normally overestimate the Communist capabilities.

He said, "In general in the intelligence field they tend to err on the safe side. I saw several operations in World War II delayed until we built up additional strength on account of some intelligence estimate. Actually when we carried out the operation (we) found the opposition to be less."

He added, "I think we are in a dangerous position *vis-à-vis* the Communists today, because there has been an almost hysterical assumption of great capabilities on the part of the Communists, some of which, in my opinion, actually do not exist."

Admiral Radford may be right, but the record since World War II does not substantiate his view. This magazine highlighted the record more than a year ago (AIR FORCE, July '55).

At that time we said, "We have not failed to underrate Soviet technological competence on every major military development since the end of World War II. This current episode (the May Day, 1955, fly-by) is but the latest in a long series of wishful thinking, ostrich-like planning, and down-right ignoring the facts of life. Let's take a look at this consistent record of ours.

"We pooh-poohed the fact that the Soviets had obtained a B-29 and told ourselves that these technologically primitive people could not possibly duplicate it in less than six or seven years. It took them exactly two years to get a copy into the air.

"Jets were quite another thing, we told ourselves. We knew the Reds were working on a copy of the British Nene engine but we predicted production problems. Yet within a year they were not only producing the Nene on their

own assembly lines but had considerably improved its thrust output.

"When the MIG-15 appeared in the skies over Korea we did our usual double-take. But it didn't take us long to settle back in the easy chair. After all, it wasn't as good as the F-86. Weren't we shooting them down at a ratio of fourteen to one? Those louts in the baggy pants had only succeeded in producing 13,000 first-class fighters in a few short years, hadn't they? Obviously an ox-cart economy.

"We took great comfort in our post-World War II monopoly in nuclear weapons. In this field we had a six-to-ten-year lead, many experts said, even if the Reds could solve the secret of atomic bomb manufacture at all. Yet the first Soviet A-bomb was exploded in 1949, just three years after they began work on it. It had taken us about the same length of time to build our first nuclear weapon.

"One would think that the Red A-bomb would have shattered our complacency. It didn't. Within a comparatively short time we had retired behind the shield of the superbomb, the thermonuclear device which would catapult us back into a position of military supremacy. But in this field the Russians caught up even quicker than they did in atomic bomb production.

"Ah, we said, but we have so many more bombs than they, ignoring the fact that counting stockpiles becomes merely mathematical gymnastics once the Soviets have a quantity sufficient to deal with our target system.

"Even while our seismographs and other detection instruments were confirming Soviet accomplishments in the field of weapons technology, we were busily erecting another straw man—not to knock down but to hide behind. What good were Red bombs if they couldn't deliver them on US targets? We had the B-36 for intercontinental delivery, the B-47 was in quantity production, and the B-52 was coming along nicely. All the USSR had was a fleet of now obsolete TU-4s, the B-29s we said they couldn't build. Deliverability. That was a nice, mouth-filling word. You know what happened to that one.

"Surely by this time the lessons are beginning to soak in. The Soviets may not be eight feet tall but they aren't all thumbs either. They are tough-minded, resourceful, industrious people who know exactly what they want to do and are doing it as fast as they can. We have been told time and again that we cannot hope to match them in numbers—either of aircraft or of men under arms. This is true. But we have also been told that we are so superior technologically that they can never match us in quality. This conclusion now proves debatable, to say the least."

Until there is more proof than experiences that go back to World War II, we agree with Mr. Dulles and the CIA.

The Symington Subcommittee will not make its final report until after the election, but there is no denying that the testimony published while Congress was in session had great effect on the Congressional move to increase the Air Force budget for this fiscal year. It is apparent to anyone who has read the 1,863 pages of testimony that the subcommittee has gathered material that the Department of Defense will find difficult to ignore.—END

Airpower Achievements of a 'Do-Something' Congress

FROM THE standpoint of national defense, and of the Air Force in particular, the Eighty-fourth Congress was definitely a "Do Something" Congress.

Recognizing the monetary savings and the increased military effectiveness that can result from keeping men of skill and experience in the service, Department of Defense authorities and the committees of Congress dealing with military affairs devoted special attention to the manpower problem and took action to alleviate it.

The many combat commanders who, in testifying on the Hill, called skilled personnel their "number one problem" should be heartened by the fact that out of twenty-two Department of Defense requests for legislation relating to personnel, nineteen were enacted into law.

Still to come was the report by Mr. Wilson's Cordiner Committee now tackling the problem of retaining the officers and men possessing special skills and experience. This will provide the basis for further legislation requests, and will probably include recommendations for pay raises for all ranks.

Here is the tally of major actions taken during the second session of the Eighty-fourth Congress which affect the AF.

Appropriations for the 137-Wing Force

The President's request for the Air Force for Fiscal Year '57 was $15,666,500,000. This total included an additional request beyond that carried in the annual budget message. The House, after a report from its Appropriations Committee, reduced this amount to $15,479,125,000. The Senate, spurred by hearings in the Armed Services Committee and the reports flowing out of the Symington Airpower Subcommittee, approved a budget of $15,539,125,000. This Senate increase was to speed up production of B-52s and jet tankers, to expand research and development programs, and to increase funds for maintenance and operations and military personnel. After joint conferences the amount finally approved by the Congress was $16,459,125,000. This was signed into public law by the President but as yet there is no firm indication as to how the additional $900 million will be spent.

(Continued on following page)

Military Construction

New authorization for construction, both in the US and overseas, for all services was approved in Public Law 968. In its original form this bill authorized the Air Force to proceed with the construction of four Talos ground-to-air defense missile sites, but with the proviso that the authorization not be used until Secretary Wilson had reached an agreement with the Armed Services Committee of both the House and the Senate regarding its use. A further proviso was added to the construction bill. Before the military service entered into any contract for the construction or acquisition of family housing units, Congress required agreement with the Armed Services Committee in each instance.

Because of these provisos the bill was vetoed by the President as infringing upon the prerogatives of the Executive Department. In the new bill, prepared as a result of the veto, the Air Force was authorized a construction program amounting to $1,360,934,000 and the construction of Talos sites was deleted.

In actual appropriations for military construction (as opposed to authorization) the Air Force received $1,228,000,000. This was $200,000,000 less than General Twining had told Congressional Committees the Air Force could effectively spend in Fiscal Year '57. This $1.22 billion, which will be available until expended, is earmarked for the construction of facilities in support of the 137-wing program.

Dependent's Medical Care

The Dependent's Medical Care Act, important to every family man in the service, authorizes medical care for all eligible dependents of military personnel—both active and retired—who are located in areas where military medical facilities are available. It further provides coverage for wives and children of active-duty military members in civilian facilities, under what amounts to a medical insurance program. The act will provide much-needed relief to servicemen when it becomes effective on December 8 of this year.

Equalization of Retirement Benefits

This public law authorizes personnel to be retired in the highest grade in which they served on active duty (for a minimum of six months) and to receive retired pay in that grade. This corrects an inequity by authorizing retroactive advancement on the retired list of certain personnel. It does not, however, authorize any retroactive increase in retired pay.

Survivor's Benefits

A new and uniform system of survivor's benefits was enacted to replace the existing inequitable program. This new program will become effective on January 1, 1957.

It increases Veterans Administration survivor benefits, setting monthly compensation to a widow at $112 plus twelve percent of the base pay of her husband (a $122-266 monthly range).

It revises the six months' death gratuity payment, setting the range at $800-3,000 instead of the existing $468-7,656 range.

It repeals the existing Servicemen's Indemnity free insurance program and it requires cancellation of waiver on National Service Life Insurance or United States Government Life Insurance policies prior to May 1, 1957, in order to become eligible for the new VA benefits.

The new act places all servicemen under contributory social security, replacing the existing $160 gratuitous wage credit. It also gives retroactive social security credit, based on actual service back to 1950, to provide a currently insured status.

AF-ROTC Flight Training

In an effort to stimulate interest in an Air Force flying career, Congress passed a bill authorizing flight instruction during the college phase of Reserve officer training. This law grants the Secretary of the Air Force the authority to provide flight instruction to members of AF-ROTC units. Equally important, it provides compensation for persons injured, disabled, or killed while taking such flight instruction. This should go a long way toward bringing in more ROTC cadets who are interested in making the Air Force a career.

Officer Augmentation

This bill authorized an increase of Regular officers in the Air Force from the present ceiling of 27,500 to 69,425. Generally speaking, the officers to be integrated under this act will be Reserve officers now on active duty. Appointments are limited to the grade of lieutenant colonel and below and certain officers now in the regular Air Force may be granted up to two years promotion list service based upon the amount of promotion list service they already have.

Medical and Dental Officer Procurement

This bill authorizes additional special pay to doctors and dentists in an effort to interest these professional people in a military career. It also grants longevity credit for time spent in medical and dental schools.

Housing

The National Housing Act was amended and the Military Housing Program extended to June 30, 1958. This new bill provides an increase in the FHA insurance authorized for military housing projects, and it further provides for an average cost of $16,500 per housing unit. Authority is also given to the Secretary of Defense (under certain conditions) to acquire existing Wherry projects by purchase, donation, or condemnation or other means of transfer.

Among the legislative items not acted upon, were two proposals of important interest to the Air Force.

The first was a request that would allow dependents to occupy "inadequate quarters" on a rental basis without loss of basic quarters allowance. This would have been a great help to the many families forced to live in World War II temporary barracks on bases throughout the United States.

Congress did not get around to approving this bill or devising an alternate bill acceptable to both houses.

The Air Force hopes this will be high on the legislative calendar when Congress convenes next January.

A second hoped-for legislative item was the authority to increase the number of Air Force general officers. Appearing with Naval and Army representatives also asking a hike, Air Force witnesses proposed an increase from the present ceiling of 425 generals to 449. Since the subcommittee studying the matter made no final report, there could be no favorable action on this request until next year.—END

The emphasis is shifting

It used to be that you would design an airframe for payload—and provide *minimum* required instrumentation.

The emphasis is shifting.

In this new age of electronic missile guidance and identification, the chicken is now the egg and the cart pulls the horse. Instrumentation comes first—after which a mobile container is designed that will carry it with greatest efficiency.

This shift finds the sturdy shoulders of Stewart-Warner Electronics braced for the greater load. Stewart-Warner has pioneered in electronics for thirty years. Today, S-W Electronics is pioneering in the stratospheric electronics of tomorrow.

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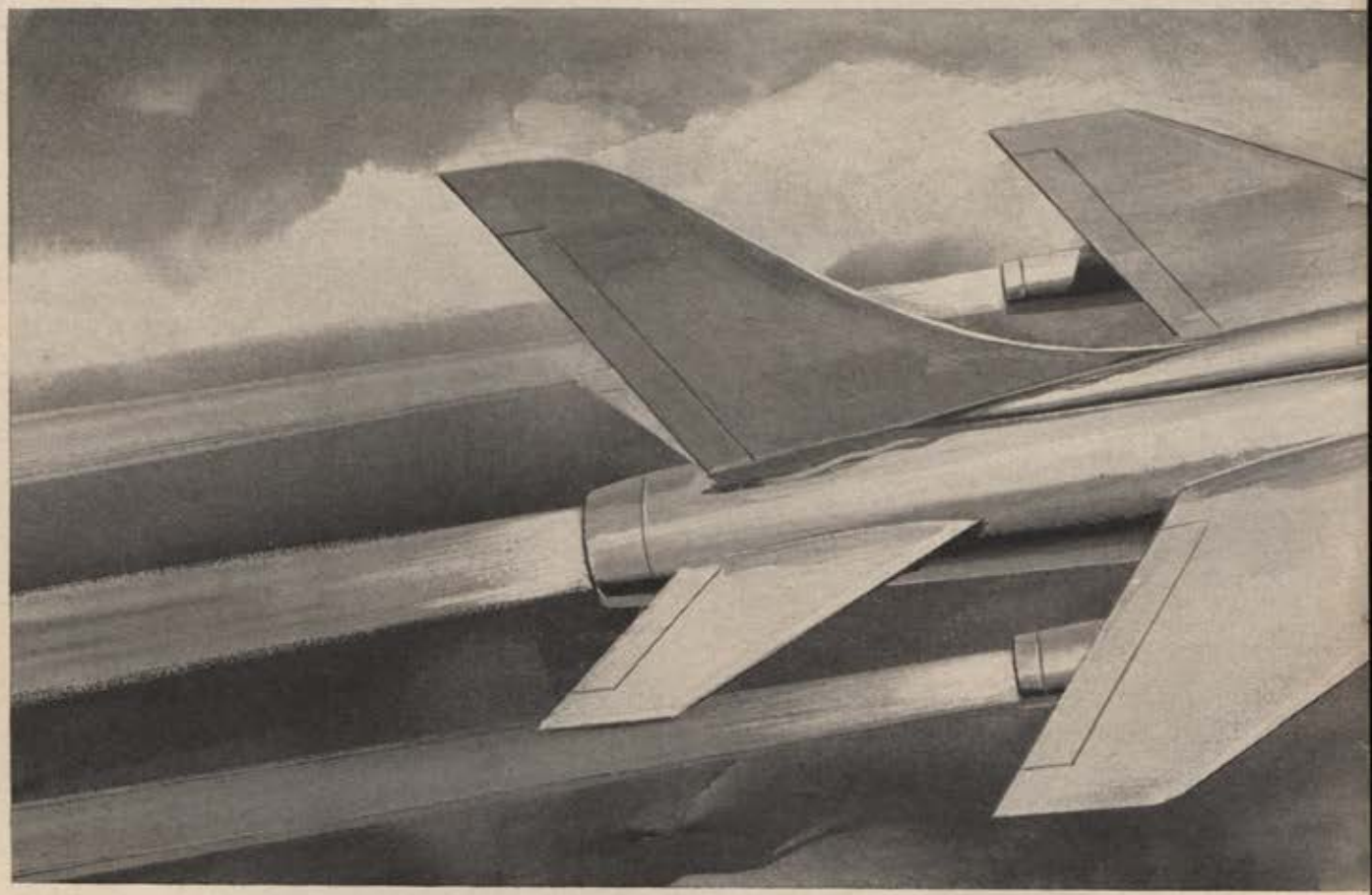
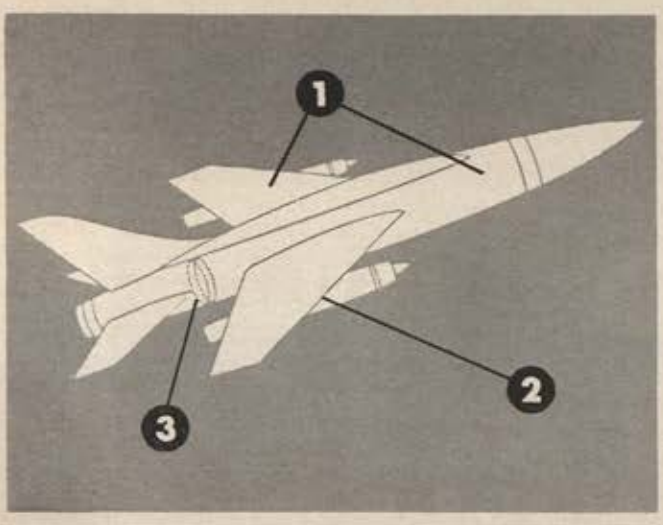
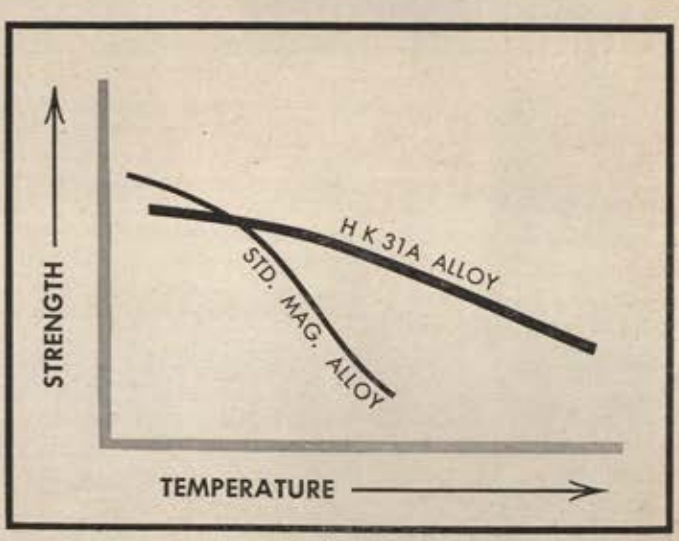
NEW DOW MAGNESIUM ALLOYS





Now suggested *for a broad range of uses in missiles and aircraft, the new Dow magnesium alloys are available in the form of (1) sheet or plate, (2) extrusions, (3) castings.*



Maintenance of strength *at high temperatures is illustrated by this chart. Performance data on the new alloys at elevated temperatures can be obtained by request.*

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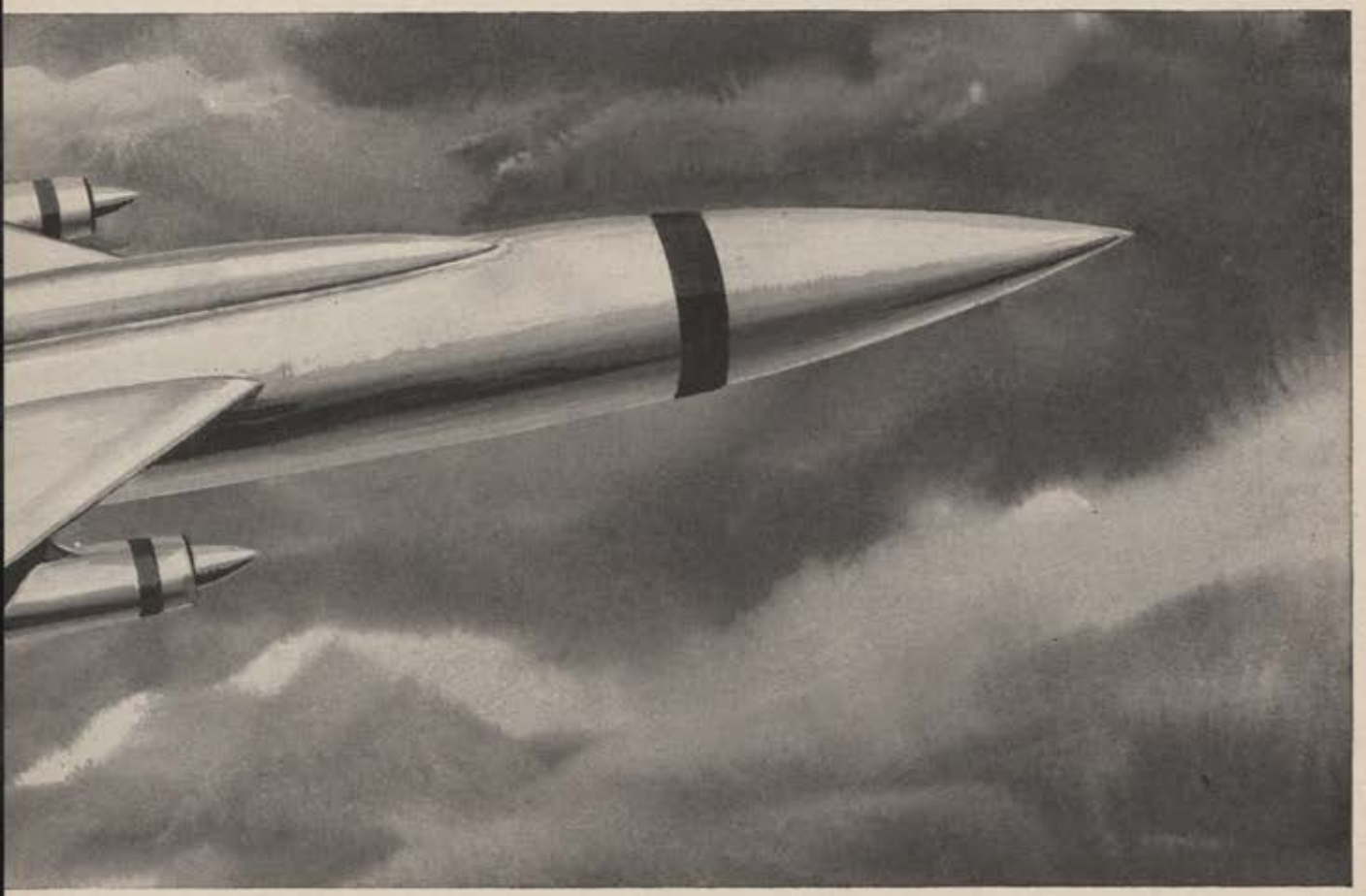

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AIR FORCE
SEPTEMBER 1956

FOR THE RECORD

What happened in New Orleans

Although the official registration at the Air Force Association's Tenth Annual Convention totaled better than 2,100, there remain some 60,000 or so of our readers who, for one reason or another, couldn't make it to New Orleans last month. For their benefit, and also to provide a permanent record for those who did attend, we are throwing our publishing budget to the winds and adding enough pages to this issue of AIR FORCE *Magazine to furnish a reasonably complete resumé. The scope of the convention program is indicated by the fact that our report fills 115 full pages. The story is not complete. Neither time nor space have permitted us to cover each individual event in the kind of detail they deserve. But much of lasting significance was said and done in New Orleans. We trust that this issue of* AIR FORCE *will help in preserving the impact of the year's greatest aviation get-together.—The Editors.*

AFA's 1956 STATEMENT OF POLICY

Unanimously adopted by the delegates to the Air Force Association's Tenth Annual Convention, on Friday, August 3, 1956, in New Orleans, Louisiana

SWEEPING revolutions in weapons technology have outmoded our country's traditional approach to national security. If we are to achieve security with solvency, fundamental changes must be made in our military establishment.

Our present system of three separate military services compels patriotic men to strive for objectivity in an atmosphere of service partisanship. The system too often ties military careers, and therefore military operations, to obsolescent weapons and concepts. The system encourages the postponement of basic decisions by piling compromise on compromise, committee on committee. It includes jurisdictional disputes harmful to national security. It is wasteful of time, money, and manpower.

The three-service system can no longer be tolerated. The goal must be one program for utilizing national resources in the national defense. We must have one defense plan. We must have a single military service with one secretariat, one Chief of Staff, one promotion list.

We must achieve this singleness of purpose, organization, and operation at the earliest possible moment. We must achieve this goal without compromising essential competition of ideas in defense planning and weapons development, while eliminating uncontrolled and wasteful competition for scarce manpower, money, and material.

As the first step, we urge freedom of transfer among the services, geared to the most efficient and economic utilization of our military manpower.

Each of us, civilian and military man alike, must place the realities of national defense requirement above narrow service interest.

To this goal, in our tenth anniversary year, we stand pledged.—END

"Biggest convention this town has ever had."

THE SATURDAY EVENING POST

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They Get Bigger and Better Every Year

By Lee Klein ASSOCIATE EDITOR

WHILE the hotel situation in New Orleans last month during AFA's Tenth Annual Convention wasn't quite like that shown in the cartoon above, it was pretty tight—even for a city that has learned to roll out the carpet for the thousands of Mardi Gras visitors who descend upon it each year. As far as we know, everyone had a bed, but there were some "flaps," and it took some expert shuffling at the reservation desks of the hotels to keep everyone happy. A big order when you consider that between 2,400 and 2,500 hotel rooms were occupied by AFA types.

New Orleans during the first week in August definitely belonged to the Air Force Association. The city and the Association seemed to hit it off, and AFA's occupation was peaceful—at least according to the police, who reported that no one from the convention was booked for any reason. New Orleans, one of the liveliest places in the nation, helped make what became the biggest and best convention in AFA's history, also an enjoyable one. But famed Bourbon Street was only a fringe benefit for the delegates who came to New Orleans to conduct some pretty serious business. The New Orleans *States* put it this way on the opening day of the five-day convention: "It becomes apparent that this is perhaps one of the most significant conventions New Orleans has ever hosted."

The weather was quite a switch from cool San Francisco—site of last year's convention. But—thanks to air-conditioning—even the heat and humidity failed to put a damper on the business at hand.

The statistics compiled after it was all over were impressive. During the five days, thirty-two major events were scheduled, and forty-two speakers—including AF Chief of Staff Gen. Nathan F. Twining and AF Secretary Donald A. Quarles—addressed the delegates and guests. At the city's two airports, 500 aircraft, over and above normal air traffic, brought convention-goers into New Orleans from all parts of the nation. The sixty-five drivers in the motor pool drove more than 20,000 accident-free miles. The reports on the local radio and television coverage were still more impressive, and one responsible official said that "more radio and television time was devoted to the AFA convention than has ever been devoted to any event held in New Orleans—including the Mardi Gras."

The biggest single event—from the standpoint of attendance—was the Airpower Panorama at the Municipal Auditorium. In the three days the show was open to the public—and including a preview party and reception—more than 83,000 persons, by actual count, came to view the exhibits.

This year's convention had special meaning for the Air Force Association. In 1956, the organization that started as a dream in the mind of Gen. H. H. "Hap" Arnold, was celebrating its tenth birthday. As a special event at the annual Wing Ding Ball, at the Roosevelt Hotel, Friday night, August 3, the events of the past ten years were recalled and eight of AFA's nine past presidents were on hand.

The five days, beginning on Wednesday, August 1, were tightly scheduled. Things began rolling on Wednesday afternoon with a Reserve Forces Seminar, and didn't let up until the Airpower Brunch on Sunday, August 5. There was something for everybody. The Reserve and Air National Guard people (*see page 150*) heard from such speakers as Maj. Gen. William E. Hall, Assistant Chief of Staff for Reserve Forces; Maj. Gen. Winston P. Wilson, Chief, Air Force Division, National Guard Bureau; and Lt. Gen. Charles B. Stone III, Commander of the Continental Air Command. That same night—Wednesday—Assistant Secretary of the AF David S. Smith spoke at the Reserve Forces Awards Banquet (*see page 146*). Also on the program the first afternoon was a Combat Logistics Conference (*see page 130*), featuring Gen. E. W. Rawlings, Commander of the Air Materiel Command, and some of the top officers in his command.

Thursday was industry's day last year in San Francisco—and it was

(Continued on following page)

The Airpower Panorama — which attracted more than 100,000 persons — opens at the New Orleans Auditorium.

Arthur Godfrey, DelVina Wheeldon, and Sen. Stuart Symington—all honored by AFA—have a few words together.

again in New Orleans. At a Guided Missiles Conference – the first ever held–moderated by T. F. Walkowicz, AFA national director (*see page 97*), Maj. Gen. Richard C. Lindsay, Director of Operational Plans for the AF, made headlines in the nation's press when he said that while "it appears unlikely that guided missiles will completely replace aircraft in any mission area during the foreseeable future . . . a look at the technical estimates . . . indicates that fifty percent of the Strategic Air Command's mission could sometime be accomplished with guided missiles." Because of the nature of tactical targets, he said, the figure would be lower (thirty percent) for TAC. He also said the Air Defense Command would be able to utilize missiles to perform as much as ninety percent of its missions.

Official AFA business at the convention began on Thursday afternoon. AFA President Gill Robb Wilson made the keynote address, and Brig. Gen. Arno Luehman, Commander of the AF's 3500th Recruiting Wing, told the delegates what his command was up against in recruiting the quantity and quality of manpower the AF needs so vitally to perform the mission assigned to it.

That night, in the New Orleans Municipal Auditorium, AFA previewed a display of the wares of seventy-one exhibitors with a stage show and champagne party, in preparation for the official opening to the public the following morning. The multi-million dollar display included many of the aviation industry's products, and ranged from a jet engine with its insides showing, to instrumentation for the space satellite project.

The Airpower Symposium—as always, one of the most important events of the convention—on Friday, August 3, featured the theme "Manpower in the Jet Age" (*see page 59*). Moderated by screen actor James Stewart—an AFA charter member and former director—the program included speeches by Dr. Alan T. Waterman, Director of the National Science Foundation; Floyd Odlum, President of the Atlas Corporation; retired Maj. Gen. James McCormack, Jr., Assistant to the President of the Massachusetts Institute of Technology; and A. J. Hayes, President of the International Association of Machinists, AFL-CIO. While the Symposium and the luncheon which followed it (featuring General Twining as principal speaker) were going on at the Roosevelt (*see page 57*), the Ladies Auxiliary and female guests at the convention were having their own day.

Joe E. Brown and Gill Robb Wilson enjoy a chuckle over something funny.

First there was a walking tour of French Quarter shops, and then an Air Age Fashion Luncheon for almost 500 at the Jung Hotel. The highlight of the fashion show came when Miss Joanne Alford, the pilot and engineer for the Glenn L. Martin Co. who is "Miss Airpower of 1956," appeared in the Airpower Gown, created especially for her by fashion designer Ben Reig. Miss Alford stepped down out of a mock-up of an aircraft fuselage, accompanied by her court.

The Annual Wing Ding and Airpower Ball on Friday night, August 3, drew a record crowd—so large that they couldn't all be squeezed into the International Room at the Roosevelt. The overflow watched the stage show on a huge closed-circuit television hookup in the adjoining Grand Ballroom. Vince Barnett, Hollywood character actor so familiar to AFA members, emceed the show and introduced such entertainers as Joe E. Brown, Jack Carson, Irene Ryan, and Belgium's entry in the Miss Universe contest, Monique von Vooren. Kicking off the evening's program, Morris Ankrum and Don Porter narrated the highlights of AFA's ten-year history. They were assisted by members of the AF's crack drill team, each symbolizing one year of AFA. Jimmy Stewart introduced Ted Curtis, organizer of AFA; Julian Rosenthal, representing the organizing committee; and eight of AFA's nine presidents—Jimmy Doolittle, Thomas G. Lanphier, Robert S. Johnson, Harold C. Stuart, Arthur F.

A group of AFA ladies pause on Bourbon Street during a walking tour of some of the unusual French Quarter shops.

They're from "Big D"—and they came to persuade the AFA delegates to hold their 1958 convention in Dallas, Tex.

Kelly, George C. Kenney, John R. Alison, and Gill Robb Wilson. The program was directed and produced by Lloyd Mitchell of Hollywood.

At the climax to the convention, the Airpower Awards banquet on Saturday night, the Association gave out its annual awards (*see page 82*), for outstanding achievement and contributions in many fields of aviation. AFA's top award, the H. H. Arnold Trophy went to Sen. Stuart Symington of Missouri, named "Aviation's Man of the Year" for 1956; the Flight Trophy to Lt. Col. Frank K. Everest; the Science Trophy to former AF Chief Scientist, Dr. Chalmers Sherwin; and the Arts and Letters Trophy to Hollywood's Beirne Lay, Jr. Toastmaster for the event, radio and TV entertainer Arthur Godfrey came in for a share of the honors himself when he was awarded the Hoyt S. Vandenberg Memorial Trophy. At the banquet, the principal speaker was AF Secretary Donald A. Quarles *(see page 51)*

The convention wound up on Sunday morning with the installation of the newly elected AFA officers.

The delegates accomplished quite a bit of business during the five days. In its annual Statement of Policy, the Association went on record in favor of true unification with a single military service (*see page 38*). The delegates also elected Association officers for the coming year, and adopted the 1956 Airpower Resolutions. Briefly, here are the resolutions which were passed:

- On the premise that 137 combat-ready wings by June 30, 1957, is an unrealistic goal under present funding policies, the Association argued that the force goal should be revised downward, or its funding basis revised upward.
- Because shockingly bad housing conditions in many overseas locations are driving highly qualified men out of the Air Force, the delegates asked for a legislative program aimed at correcting this.
- Necessary steps were urged to establish a system to prove more realistic compensation for skilled AF technical personnel and for personnel serving at remote and isolated locations. The resolution stated that pay received by AF technicians compares unfavorably with salaries paid for like duty in the civilian economy.
- Because base exchanges and commissaries of the AF are unsatisfactory, the delegates urged restoration of the base exchange and commissary services to the extent that they again can be considered inducements to military service.
- The AFA delegates called on the Department of Defense to strengthen the Information Service agencies of the AF because of the need for better public understanding of such Jet Age problems as noise, increased air traffic, and accidents.
- The delegates voted to lend AFA support to youth aviation education —including familiarization instruction in the role of airpower and aeronautics.
- President Eisenhower was called upon to consider the desirability of creating a cabinet-level office dealing with aviation policy matters.

Though they were mostly business, the official sessions had their lighter moments too. On Saturday morning, when the halls outside the Grand Ballroom at the Roosevelt were quiet and deserted, the stillness was shattered by raucous strains of Dixieland from the business session going on then. Dallas was making its pitch to win the 1958 AFA convention. That they were at least partially successful is indicated by the fact that the members directed a committee to study the pros and cons of Dallas and Cleveland before a choice is made.

The men who market the commodity called "news" expected the AFA convention to produce some and sent some of their best people to cover it. And they were not disappointed, judging from the newspaper clippings that poured into AFA national headquarters from every corner of the US. As the New Orleans *Item* put it, "Actually, it would be practically impossible for so important a group of Air Force officers, Air Force Association civilians, industrialists, and scientists to assemble and *not* make news."

Perhaps the most newsworthy single item to come out of the five-day affair was the announcement than an AF rocket research plane, the Bell X-2, had probed the thermal barrier when it was piloted more than 1,900 mph by Lt. Col. Frank K. Everest, Jr., this year's AFA Flight Trophy winner.

Again quoting the New Orleans *Item*, "Conventions we have seen plenty of. And New Orleans, which does not have to be modest about its attractions, is delighted to have them all. . . . This promises to be a convention Orleanians won't forget."

And most Air Force Association members would probably agree that the feeling is mutual.—END

Part of the crowd at AFA's Airpower Panorama in New Orleans's Municipal Auditorium. More than 83,000 crowded in.

They Came, They Saw . . .

They Conquered NEW ORLEANS

By Pen Wilson

LATE ONE Sunday afternoon in New Orleans last month a taxicab pulled slowly away from the Hotel Roosevelt. It was loaded with three Air Force officers, their luggage, and a number of packages that could only have contained souvenirs.

Suddenly one of the officers rapped sharply for the driver's attention. "Hey, wait a minute," he called.

"I forgot to get the recipe for a Sazerac cocktail."

"Can't wait, Cap (the officer was a lieutenant colonel), if you want to get your plane. Get it on your next visit." And away they sped, virtually the last of the biggest Air Force Association convention in AFA's history.

This, possibly better than any other way, puts the lid on the New Orleans story of the five-day convention, insofar as it directly concerned New Orleanians. To coin a cliché, they came and saw and conquered as no other convention participants had ever conquered before in New Orleans's long history as a convention city.

It will take months of slide rule manipulations before the Chamber of Commerce of the New Orleans area will come up with anything like an accurate figure on what AFA meant to the Crescent City during the first five days of August. But the Chamber somehow decided, after a check of restaurants, bars, merchants, and transportation interests within the city, that individuals attending the convention left nearly $300,000.

"One of the biggest, if not the biggest, we've ever had," was the opinion of the Roosevelt's Al Bourgeois, the convention manager of the headquarters hotel.

That it was the biggest in AFA annals was unquestioned—19.6 percent bigger in terms of attendance than the 1955 assemblage in San Francisco, and that, in turn, was the biggest up to that time. That a new record had been set was apparent almost from the beginning, but when Gill Robb Wilson, the AFA's immediate past-president, announced that

after the final day the registration was 2,109, it then became official.

But that figure only begins to tell the New Orleans story. Wilson noted that the delegates were accompanied by family members, that industry was on hand in a big way, and that a large segment of the nation's press (160 representatives of newspapers, wire services, magazines, and networks registered) had come along, bringing the total to something more than 4,000. They occupied between 2,400 and 2,500 New Orleans hotel rooms, Wilson claimed, and a check of these figures when it was all over showed the AFA leader had not exaggerated. In addition about 200 rooms in motels and guest houses were occupied by those who couldn't find hotel rooms.

The convention's important, serious side was told daily in the New Orleans press, not to mention the thousands of words filed by out-of-town correspondents from Maine to California and all the wire services. It is told in detail elsewhere in these pages. In fact, to cite an example, the staid, conservative *Times-Picayune* alone carried a total of 143 inches of type over the five days on the main convention story, some fifteen photographs, and close to a dozen interviews ranging from Air Force Secretary Donald A. Quarles to one with an AF-ROTC cadet who won a measure of fame by dropping in to voluntarily crank a mimeograph machine.

New Orleans at night. Bourbon Street never sleeps, delegates discovered.

Daily there were big stories. Whenever Gen. Nathan F. Twining and Secretary Quarles and people of their ilk assemble in the same city at the same time and deliver major addresses, it is news, ipso facto, and when what they have to say is, in turn, news, the situation then commands attention of an international scope.

Doubtlessly the most spectacular story of all was the one broken by the Associated Press's Vern Haugland, the AP's crack aviation reporter, who told how Lt. Col. Frank K. "Pete" Everest, Jr., had flown the Bell X-2 research rocket plane 1,900 miles an hour a week earlier. From that moment on, Everest was besieged with telephone calls from reporters who tracked him down to his quarters in the St. Charles Hotel. He answered all queries with a crisp, but pleasant, "No comment," and it was obvious to the newest cub that the wraps were still on.

Unquestionably the press had plenty of breaks, not the least of which was a large press room outfitted with several dozen typewriters, a battery of telephones, and a pair of Western Union machines which, incidentally, filed something like 37,000 words reporting the convention to every corner of the United States. On one day alone a single WU operator moved 10,000 words to twelve different states. Additional stories filed by wire services using their own facilities brought the total news coverage to an estimated 50,000 words.

The visitors found New Orleans is warm, warm, warm in early August. The mercury hovered at eighty-six on the first day, and two days later it had soared to ninety-four, and the relative humidity kept pace. There were occasional bursts of showers, and now and then a spectacular, noisy thunderstorm, but by and large, convention participants managed to beat the heat through air conditioning, which New Orleanians have come to accept as a necessity for continuing life. As a matter of fact, it was not until the week following the convention that a heat wave moved in and the local citizenry began to complain.

Still, the crispest of uniforms wilted fast, and the uniformed personnel discovered that the major hotels got two dollars for cleaning and a buck for pressing. And they got plenty of business, uniforms and mufti alike.

How did the city take to the AFA people? Something like this:

"A good bunch of guys," seemed to be the cab drivers' consensus. "Good tippers on a short haul and none of this seven-to-a-cab business."

The waiters in some of New Orleans's famed restaurants were more conservative. "Who knows," said one at Antoine's. "We didn't see enough of them. They had too many parties, too many luncheons, too many banquets for them to spend any time here." But the waiter finally acknowledged that "Oh, a couple of hundred, I suppose," did dine at Antoine's, and that they seemed happy sampling New Orleans's Creole dishes.

Some of the VIPs at the convention—Gen. Nathan F. Twining, USAF Chief of Staff, surrounded by a few of the outstanding airmen who were AFA's guests.

And AFA people gave fabled Bourbon Street a whirl, too. "But I can drink in the Colony for less than this," moaned a New Yorker. Well, the rap of $1.95 for the first drink (an ounce and a quarter) of unnamed bourbon is pretty stiff, and about $1.50 for any other drink is rough, too, but apparently the delegates had been well

(Continued on following page)

briefed that the fleshpots of the French Quarter come pretty high.

AFA found that the French Quarter features something more than the bumping and grinding. The operators of guided tours reported a brisk business, and the wives on hand were treated to a walking tour of French Quarter shops. But when it comes to shopping, the men will surely best remember two small shops featuring items in black lace that passed under the name of lingerie but which are seen mostly in the Folies Bergère.

"A well-behaved bunch of gentlemen," was the opinion of New Orleans police Capt. Al Theriot, who makes it a point to check on convention behavior. It is almost unheard of for a major convention to come to New Orleans and not have at least a dozen delegates wind up in the tank for over-celebrating. "We didn't book a single person from the convention," Captain Theriot said. "Very unusual."

Possibly the spirit of the non-working-hours convention was best typified in the lobby of the Roosevelt. Over the registration desk hung huge posters drawn especially for the occasion by Milton Caniff, the creator of "Steve Canyon," and showing his "Miss Lace," in one of her alarming, sheath-like gowns slit almost from the skirt to the shoulder. She was leaning on the reservations desk, and this is what she was saying:

"Say, Bird Soldier, there's a mix-up in Lace's reservations! Would you like a roomie who can sing harmony, knows extra verses of 'On Top of Old Fuji,' and who digs some spots in New Orleans that Jean Lafitte couldn't have got into—a very cooperative type who's willing to stay up all night or go to bed before dinner . . . a good egg, who isn't going to blab back home about what we did here at the AFA convention? Then you're in luck! Because my brother came with me—and he doesn't have a room, either." So it wasn't all airpower symposiums and guided missiles conferences.

The crush to get into the *Roosevelt's* large and gold International Room for the Wing Ding rivaled the New York subway during the rush hour. Three uniformed patrolmen held them back, for inside it was standing-room-only. Several hundred discovered they could gain entrance by racing through the hotel kitchen and into the room through the waiters' entrances, a solution which startled the chefs, uprooted a few waiters, and outwitted the cops. Jack Carson, one of the Wing Ding entertainers, was stopped at the door by an overly zealous guard.

Joanne Alford, Miss Airpower of 1956, speaks to the crowd at the Panorama Preview. From left are Mel Leavitt, emcee; General Twining; and Gill Robb Wilson.

The comedian shrugged his shoulders, turned away and nonchalantly started handing out his autograph to the group of fans clustered about him. He was finally rescued and escorted in by a convention official.

Of course the convention had its quiet moments. Some of them were also unique and impressive.

Example: At the Airpower Symposium luncheon—for nearly 2,000 persons—on the third day, which was highlighted by General Twining's address, nineteen outstanding airmen were introduced one by one from their positions at the head tables, raised a few feet above the main floor.

As each airmen was introduced, the

THE WHITE HOUSE
WASHINGTON

July 28, 1956

Dear Mr. Wilson:

With pleasure I offer my congratulations to all members of the Air Force Association on its tenth anniversary. As I shall always remember that I had the honor of addressing your first convention in Columbus in 1947, I particularly regret that I am unable to be with you for this anniversary meeting in New Orleans.

In its first ten years of existence the Air Force Association has consistently supported efforts to ensure the security of this nation and of the entire free world. I am confident the organization's next ten years will be a period of equally constructive contributions to the achievement of a just and lasting peace in the world.

Please convey my personal regard and best wishes to all those attending your anniversary convention.

Sincerely,
Dwight D. Eisenhower

Mr. Gill Robb Wilson
President
Air Force Association
Mills Building
Washington, D. C.

Above is the letter of greeting from President Eisenhower read by AFA President Gill Robb Wilson to delegates at the Convention.

Two visitors apparently dressed for space flight and Belgian beauty Monique von Vooren get a kick out of Joe E. Brown tasting cake at the Lockheed party.

Part of buffet served by Douglas Aircraft Co. aboard liner *President*.

vast room grew more silent, the waiters pausing with laden trays. When the nineteenth had been introduced, Gill Robb Wilson called for an ovation. General Twining rose to his feet and with him arose lieutenant generals, major generals, civilians, everybody. The burst of sustained applause was deafening—and inspiring. Even the waiters put down their trays to join in the applause.

The incident was repeated the next night when four Medal of Honor winners also received a standing ovation.

Of course a number of entertainers were on hand from New York and Hollywood and, in one case, points as far east as Belgium. At least one of them, Arthur Godfrey, made what must have been an heroic effort to attend. Godfrey arrived in New Orleans the day before he was to serve as toastmaster at Saturday's Airpower Awards Banquet, and many saw him hobbling painfully through the Roosevelt's crowded lobby. But gone was the cane the next night even though Godfrey's role called for him to be on his feet much of the time.

From Hollywood came Vince Barnett, master ribber and character player in more than 400 films. With him were Jack Carson and Carson's charmer of a wife, Lola Albright. Then there was comedian Lord Buckley and, from Las Vegas, comedienne Irene Ryan.

It is unthinkable that Joe E. Brown would fail to join an AFA convention, and this one was no exception. And, of course, the same was true of Jimmy Stewart.

Joe E. Brown, incidentally, managed to get the Wing Ding over an awkward moment when the microphone failed just as Belgium's contribution to beauty, Monique von Vooren, was to start her first number. While a host of technicians and plain volunteers went to the mat with the mike, Brown stepped in to waltz blithely about with the beauteous Miss von Vooren.

New Orleans likes to think itself blasé about movie stars but when the stars arrive, New Orleans goes just as ga-ga as everyone else.

This, then, is the New Orleans story of AFA, *circa* 1956. There is every reason to think the city scored a hit with AFA. And if anyone doubts that AFA went over big with New Orleans, they should know that on the convention's fourth day the governor of Louisiana and the mayor of New Orleans, bitter political enemies, joined together in a telegram urging AFA to return to the Crescent City in 1958.

And one final point. For that lieutenant colonel in the taxi, the one whose driver said they'd miss their plane if they dallied, here's the recipe for Sazerac cocktail:

Pour a few drops of Anisette in a large, well-chilled Old Fashioned glass. Roll the Anisette around, wetting the glass's interior. Now a dash of Angostura bitters and a dash of Peychoud bitters. Add a lump of sugar but don't muddle it—just let it soak. Now a couple of ounces of straight bourbon, stir with ice cubes, take a twist of lemon peel and run around the edge of the glass, and finally, drop in the peel. Then close your eyes and beat out the Air Force song to the offbeat strains of "Way Down Yonder . . . etc."—END

Jimmy Stewart leads the "Airmen of Note" at AFA's annual Wing Ding.

ABOUT THE AUTHOR

It struck us as a good idea to include in this issue the reaction of a native of New Orleans to all the hubbub of the AFA convention. We found such a native in the person of Pen Wilson, a reporter for the New Orleans Times-Picayune. *Pen was one of an even dozen reporters from that paper who were covering the convention. A veteran newsman, he's worked on papers in Texas and New Mexico. Before that he was in New York, and for three years free-lanced out of Paris. It was there that he met his wife, Monique.—The Editors.*

Keynote Address

Manpower—Challenge and Opportunity of Our Times

In the vision and dedication
of its members lies the true strength and influence
of the Air Force Association

Gill Robb Wilson

PRESIDENT, AIR FORCE ASSOCIATION

I HAD A speech all prepared here. I wrote it out myself last night. But today I find I am not capable of reading it—I am just going to talk to you a little while.

I have often thought, wouldn't it be wonderful for everyone in the Air Force Association to have exactly what they want? Wouldn't it be wonderful to have everybody elected President, everybody a Wing Commander, everybody run successful Squadron meetings, and all of that? You're a wonderful group of guys, and you'd better be, because the heritage that lies behind you deserves nothing but the best that you and I can turn out.

So, I haven't the heart to make a speech to you. I just want to talk with you for a little while. You know, if you could abolish all of the suspicion in the world, you wouldn't have any world wars or rumors of wars. And when the statesmen of the world become as civilized as the soldiers of the world, then maybe we will find some solution to the problem of freedom for all peoples, and the world will find peace. But in the meantime, you and I must try to do the best we can with what we find to work with.

So here we stand today in this Air Force Association—we're strong, yes, with some 52,000 of the most knowledgeable airmen of the world. Thanks to the efforts of all of you, who have so much dedication that it's just a kind of added glory to patriotism, we are financially solvent. We can throw these big conventions, and the whole world listens to what has been said. All the brass comes down and the crowds turn out, and they say to you, "Nice going, good!" But that's not the true measure of our power. Our power lies in our vision, our dedication.

You know, we talk about the man in uniform being dedicated. And he has to be dedicated, there's no doubt about that. Some people up at my magazine some time ago said to me, "Look, we go out to these air bases and all these kids talk about is, 'jets, jets, jets,' and they have lines in their faces, and this whole picture seems to us a little tense. What's happened?"

Well, I arranged to send them to get a little orientation in the F-94C. Now they know the story. Not only have the machines got to be that way, but the men have got to be that way. And that's too much of a strain for anybody to live with without the consciousness that the power and the glory and the understanding and the devotion of the nation is behind them. And, that's where you and I, who are a little rusty on the procedures, that is where we come in.

When I was a kid in the university, I majored in philosophy and in comparative religion. I studied the rise and the fall of all the empires of the world. I learned that everyone of them contained within themselves the seed of their own destruction. And when I was a young fellow, I used to think: "Yeah, but that's not for us—we'll make it!"

I never could find any common denominator as to why one after another of these civilizations, these nations, rose to supreme heights and then crashed. I did exploration at Rome. I dug up the relics and the ruins of ancient Carthage and Greece and Rome and Turkey and Mount Ararat and all those places, and I used to think that couldn't happen to my home town—it couldn't be plowed up like that—and my people.

And then about two years ago, I thought, "Maybe it would be good to go back, study this thing from the standpoint of all I have learned, not as a kid learning theory about life, and not from the impatience of an airman, but from the cold, hard logical experience of a citizen." What happened?

I went back and started with Babylon, came up through the Pharaohs and the campaigns of Alexander and Carthage and Rome and all of the rest of them—even up to the present time, and the days since you and I lived, the glory of empires that seemed to us impregnable, and now they're down the drain.

As near as I can determine, this is what happened. These people fell in their successive turns and times, not from conquest, but because each in turn failed to measure up to the opportunity that some unique development, some religious depiction, some political philosophy, some scientific theory gave them a chance to explain. And when they turned their faces, and failed to see and understand that thing and to make it their own, they were sitting ducks for the machinations of whomever came along. They didn't have to be too big to push them off then, and they never were too big.

The theme of this convention is Manpower. We have heard it reiterated from every platform of every forum we have had here. General Twining will talk about it tomorrow and Mr. Quarles will talk about it Saturday night because they can't do anything else—that's it—technical manpower. And they'll say, to make the services better let's give them more rewards. Let's do this, let's do that to help them. Sure. But that's not the whole answer.

Why is the technical manpower not there in profusion? Because the source from which it springs, the public beliefs of the nation, the homes out of which they come, the things that are held up to the kids as being

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right and worthy and patriotic, those things are lacking. Public understanding and technical manpower are cut out of one and the same cloth.

Now, you and I, as members of our Association, can't solve the technical manpower problem *ipso facto* by going out and saying, next year the universities will turn out 60,000 scientists, chemists, physicists, metallurgists and what not. You can't move history that way.

Ordinarily, you see, time takes care of these things. You know as well as I do how long it took, for example, to arrive at the Magna Carta. You know the travail that lay behind our own Declaration of Independence—a new philosophy of life. You know the time it took for the evolution of the concept of Freedom of the Seas—the thing that held the world in security and in peace for so many years.

Well, if we had the time, the centuries, we could do it—no doubt about it, but we are under great compulsion—Red Chinese marching in Asia, Egyptians seizing the Suez Canal, North Koreans coming out to take over one of the last toeholds of freedom in Asia, the showdown in Indonesia, the Berlin Airlift, the Greek Civil War—you know these aggravations as well as I do. Those aggravations are going to keep up because they are merely steps in a declared avowal to conquer the world.

So, you and I don't have the kind of time that is required to allow the centuries, even decades, to take care of the concept of airpower which will produce the technicians, the jet pilots, and the type of person that it takes to operate and man and guide all these things that we have seen in all these presentations. We have to move fast. And if that leadership doesn't come with us, where will it come from?

That's what makes me look at you and think that you are so much taller than you understand you are, that my mind almost runs beyond my imagination, trying to grasp the opportunity that is yours.

I don't know where's the answer to all of this crying need—which is going to increase rather than decrease—or where it's going to come from this outfit. This is the only dispassionate voice of airpower that I know of. What about all the others? They have aircraft industries associations, aircraft union associations, tremendous aircraft associations. All of them are wonderful, but they are not dispassionate by any stretch of the imagination. Where does a country find that? It is precious stuff, I tell you.

The reason that we're in this situation is because of guys like me, who have been at this business all their lives, but who aren't very bright. I am asking you to think through problems today which, back yonder when I was the age of a lot of you, I couldn't understand. I just wasn't very bright. So, I'm asking a lot of you, maybe too much, sometimes. I throw things at you, and when you knock my ears down, I sit down and think "Well, why not? That is the way I would have felt if I hadn't lived so long."

I remember the times when we airmen had no stature, we were part of the Signal Corps. God bless the old Signal Corps—they gave us an early home.

And then we got out from under the Signal Corps, and we had a little unique organization of our own. My outfit was even made a wing of the Guard Squadron—we were Division Aviation. Was I happy! I thought, "We've got it made. We have busted out of the shackles, we have got stature." Then I had a reserve group, and I sat back and rocked because I expected the world to see these things, and all of its implications, and I expected the world to understand that we weren't dealing with airplanes, that we were dealing with another dimension—the vertical stature of our land and its future.

I got my ears pinned back on that. I learned that that wasn't true. So, in the Twenties we go down and we write some laws, and they set up a Bureau of Air Commerce. The thing was gettting dollar value now, you see. We set up a Bureau of Aeronautics in the good old Navy. There was set up an Air Corps in the Army. Brother, did we think we had it made. Well, we soon learned we didn't, but we still didn't learn enough then.

Then, Bill Mitchell started to lead us in public impact. Finally, as a result of the Mitchell trial, you could read the papers and see that the American people were sure with us. So, I said to myself, "We lost the trial, we lost the battle, but, by God, we won the campaign. They see it now." There it was in black and white.

Then we came up to the war, and two years before the war we had to use all the influence we could muster to keep the budget off of the Bureau of Air Commerce and our air wings from being wiped out as an economy measure. That was a blow, but we still didn't understand what it was all about.

Then, when the war was over, I went over to the Berlin Conference. I was a newspaper man. I wrote gobs about it. Look at this, here's the testimony—here's Berlin, here's Dachau, here's Stuttgart, here's Schweinfurt, here's Berchtesgaden, here's Frankfurt, and I wrote about all these places. I said, "If all the world can come and see now—and we have got it here to see—nobody can miss the implication of airpower now."

Two years later, the United States Air Force was one combat wing, and when the boys went out to Korea, they went out there with models that were from three to four models behind what a decent research and development program could have given them.

Here was my mistake. I was thinking about aviation as a thing. I didn't quite get the idea that aviation is a way of life, a way of thinking. Airpower is an understanding of a new dimension. If I had understood that, away back yonder, and grasped the significance of it—I did know that it usually took centuries for nations to grasp the opportunities with revolutionary aspects, but I didn't understand this—how big this thing was.

Now we understand that. This is an organization whose character is grounded in experience.

We can hold this fort if we can get this job done. We are going to turn over to our kids a standard of living, of happiness, of travel, of knowledge, of fraternity, that no people in the world have ever known before. The power, the glory, it can all be theirs, if we do this thing. If there was anybody else to do it, I sure would call them out and challenge them. But I don't know who, except the Air Force Association of the United States, has the self-indoctrination, the self-grounded experience, the devotion, the expansion, and the distribution around over this nation, to do this job.

I don't know much about organization, I don't know much about leadership. The only thing I know is that if I sweat hard enough, and if I am selfless enough, the darkness down the middle of the road always seems to develop a light, and the darkness inside of me gives way to a kind of a light there, too. And these two things meet and I can see a white line on the walk.

You have the devotion, the understanding, the responsibility. God bless you. I wouldn't ask for my personal life, or my ambition for my country to be tied up with a greater gang. —END

1955-56

Annual Report

OF NATIONAL HEADQUARTERS

Steady growth on all fronts—membership, field organization, projects, influence, prestige—highlight AFA achievement over the past twelve months

THE ANNUAL report of AFA is a story of continual growth and expansion.

Particular mention is due our series of Jet Age Conferences. In February of 1956, at our national conference in Washington, we brought together for the first time all the elements of aviation to explore problems of jet noise, air traffic control, and airport expansion. The Conference also brought together all elements of AFA for the first time.

Since February we have had Jet Age Conferences across the country—twenty-five conferences in all—at local, regional, and state level, and there are more to come. The largest, in Tulsa, attracted more than 500 people from twenty-two states.

During the past year, Arthur Godfrey's mention of our April issue of AIR FORCE Magazine—devoted to Strategic Air Command—on his television and radio shows resulted in more than 160,000 written requests for the magazine.

We condensed the SAC issue into a twenty-four-page reprint and mailed a copy to each of the 160,000 persons who had written us.

But such "one-shot" efforts, however important, cannot be compared to the solid expansion of AFA membership.

The paid membership of the Air Force Association, in keeping with the Constitution, was 52,299 as of June 30, 1956. This represented an increase of 11,654 members—more than twenty-five percent—over last year's figure.

This growth was not dependent on any fancy gimmicks or trick premium offers. In fact, the average solicitation cost per new order was encouragingly low. Also, the increase has had no bad effects to date on our continued high renewal rate of eighty percent. In addition, nonmember subscribers to AIR FORCE Magazine went up from 7,342 to 10,565 during the year.

Since our 1955 Convention, we have chartered twenty-three new Squadrons in thirteen states. Our current total is 142 chartered Squadrons plus five chartered Flights.

We now have Wing organizations chartered in thirty-six of the forty-eight states. New Wing charters were issued during the past year in Tennessee, Mississippi, and South Dakota.

During the past fiscal year—July 1, 1955, through June 30, 1956—a total of $19,801.50 in membership kick-backs was refunded to the Wings and Squadrons, an increase in kickback money of more than $5,000 in a year. In addition, expense allocations to twenty-three Wings totaled $8,340. Thus, a total of $28,151.50 was paid out to Wings and Squadrons in kickbacks and Wing allocations, a rise of more than $7,000 over the year before.

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On the financial side, Air Force Association showed steady progress. During the fiscal year just ended our income exceeded expenses by $25,530. Our principal, as reported in the audit, stood at $102,056 as of June 30, a gain of nearly $20,000 over the same period last year.

Financially, we are still getting a steady growth of income from AIR FORCE Magazine. The magazine this year showed an excess of income over expenses of $151,044, an increase of more than $30,000 over last year. Membership showed a profit of $55,458, and the Industrial Associate program netted a profit of $25,663. Yet, as our National Treasurer has reported to the Board of Directors, we still lack the reserve accounts essential to sound business practice, and we have little or no cushion should lean years come upon us.

On the Wing level, the work of Pennsylvania is worthy of special note. In the aviation education field, the Florida Wing has stimulated twenty-two Florida schools to introduce aviation education courses into their curricula. The Nittany Squadron's co-sponsorship of the Annual Penn State Aviation Workshop has been a continual force for good. In Michigan, ROTC banquets of the Vandenberg (Detroit) and Lansing Squadrons were examples of good programming.

In the membership field, we again pay tribute to Art Storz of Omaha. For the third straight year, Art's campaign—pretty much a one-man show—has resulted in more than 1,000 members coming into AFA.

At the same time, it is appropriate to remind ourselves that we are carrying a number of Squadrons and Wings which exist more in name than in fact. There is a growing feeling that perhaps we should be a little bit tougher on this score, even if some charters have to be revoked.

It can be safely said that our units have been better serviced during the past year than ever before. For example, President Gill Robb Wilson alone traveled more than 62,000 miles on AFA business—on his own time and money. His travel, and that of the staff, added up to more than 200,000 miles during the past year. It included visits to fifty-four cities in twenty-seven different states, the District of Columbia, and Canada.

The Reserve Affairs office of the Association well represents our Air Force Reserve and Air National Guard members. Some 37,000 words of copy pertaining to the Guard and Reserve have appeared in AIR FORCE Magazine during the past year. All fifteen resolutions passed by the 1955 Convention in San Francisco on Reserve Forces matters were successfully placed on the agenda of the Air Staff Committee on Reserve and National Guard policy. Our Reserve Affairs office deserves major credit for obtaining Department of Defense approval for rated personnel of the Air Force Reserve and Air National Guard to conduct thirty-six additional paid training assemblies per year.

This office also spearheaded the effort of having the Air Staff Committee elevated in stature from an Air Staff group to an arm of the Secretary of the Air Force. It consulted with the Comptroller General of the United States in obtaining a successful appeal from a ruling that threatened to reduce the number of creditable points a Reservist might earn in one year. Its efforts assisted materially in withdrawing from Congressional consideration proposed legislation that would have closed Mitchel AFB and denied this installation to Reservists in the metropolitan New York area.

The thirteen-member Air Reserve Council has met during the year in Shreveport and Washington. The Air National Guard Council, with the same number of members, has met in Washington, New Orleans, Augusta, and Colorado Springs. Special mention is due the latter meeting. Here, for the first time, Air Guard leaders considered the future role of the Air Guard in terms of the equipment available. From this study will come plans on the relationship of the Guard to the Century series of aircraft and even guided missiles.

Our Reserve Affairs director has made visits to Guard and Reserve units at twenty-one locations throughout the country in the past year, covering each numbered Air Force area in each section of the country. As a by-product of these visits, Air Force Association squadrons have been started or rejuvenated in such locations as Niagara Falls, N. Y., Fort Smith, Ark., Atlanta and Savannah, Ga. AFA's annual Earl T. Ricks Memorial Jet Flight also is handled by our Reserve Affairs office.

Our Industrial Associate Program has continued to expand. In the past year we have sponsored, in cooperation with the Air Materiel Command, a series of regional meetings on various aspects of Air Force procurement and production. Of course, industry exhibits continue to be a major part of our programs.

Our membership arrangement with the Arnold Air Society has furnished us with close to 5,000 Cadet members. The Society's administrative office is located in AFA headquarters and is in the very capable hands of Lt. Col. Louis J. Ciccoli. In addition to this close cooperation with the Arnold Air Society, for the ninth consecutive year, we have presented our Silver Medal to the outstanding Air Force ROTC Cadets at more than 100 colleges and universities.

AIR FORCE Magazine continues to show editorial growth. Its articles continue to be widely quoted and reprinted. Especially worthy of mention is the fact that the entire SAC issue, which was lauded by Arthur Godfrey, also was reprinted in the *Congressional Record*, the first time that that has ever happened to any magazine.

Looking toward the future, we have big plans for an Air Force Book Club. Its primary purpose will be to encourage the writing and publishing of good airpower literature.

The Air Force Foundation has been organized and operating since July. It is an organization separate and apart from AFA, although the Board of Directors of AFA is, in fact, the Board of Trustees of the Foundation.

We have just established the Flight Pay Protection Plan. The reaction has been enthusiastic. Under this plan, underwritten by the Aetna Insurance Company, we reimburse loss of flight pay—for health or accident reasons—from the time the government ceases payment for a twenty-four-month period at a cost of only one percent of the flight pay.

We have established new awards for outstanding achievement within the Air University, Air Research and Development Command, and Air Materiel Command.

For our 1957 convention we go to Washington. Here we will commemorate, on August 1, the Fiftieth Anniversary of the Air Force.—END

HOW MUCH IS 'ENOUGH'?

The Hon. Donald A. Quarles, SECRETARY OF THE AIR FORCE

IT IS a very great satisfaction to me to be here with the Air Force Association on the occasion of its tenth anniversary banquet. To say that the Air Force Association means a lot to the Air Force would be the height of understatement. Your active members are Air Force alumni and Air Force friends who have banded themselves together to be in the spirit of good fellowship, but also with the common purpose of promoting the security of the United States through airpower; and more specifically promoting the progress and welfare of the United States Air Force, including the Air Reserve and the Air National Guard.

It is a kind of alumni association and, like other alumni associations, its views and objectives are not always in complete accord with those of the current management of the alma mater. An alumni group, for example, might be fairly "hell-bent" to "can" the dean, or the prexy, or even the football coach, whereas the management of the alma mater might be inclined to feel it was doing about all it could be expected to do under the circumstances.

Confronted by such a situation, a real smart prexy would recognize that the alumni and the alma mater really have the same long-range objectives and would deftly turn attention from, let's say, thé unsuccessful football season to the needs of the college alumni fund. In the present case and for the present year, our alumni fund is not doing too badly, but I do invite your attention to the fact that we will have a problem next year.

So, with these philosophical reflections about our occasional diversive points of view, I am happy to bring you the greetings and sincere thanks of what I will call the current management of the alma mater for the ten years of fine support this organization has given the Air Force in the interest of airpower and, indeed, in the interest of the security and welfare of our country.

I am gratified, too, to be here on this occasion when you honor a most distinguished old grad, the first Secretary of the Air Force. Although I place a very high value on his friendship, he and I have been in well publicized disagreement from time to time during the past year, but I believe it has been disagreement as to the immediate course of action rather than as to objectives. While I still hold to the position I have taken all along, I respect the position of the distinguished first Secretary of the Air Force, and I am happy to be a witness to the great honor the Association is paying him here tonight.

I am sure you will all agree that this occasion calls for forthrightness in dealing with the issues before us. I therefore propose to lay before you frankly my views on some of these issues, even though I am conscious of the fact that they will not meet with the full agreement of all present. It is part of the good democratic process to expose such views to public scrutiny so as to get them corrected, to the extent that they need correction, by public debate.

After all, in this business of airpower for national security we are dealing with intangibles, and many important elements are at best only partially known. None of us can afford to be categoric. Under such circumstances, it is not surprising that we find strongly divergent opinions about the state of our airpower. I should like to express to you my confident conviction that United States airpower is clearly out ahead of its nearest competitor. I believe further that if we stay on course there will be no time in the future when United States airpower will be insufficient to its great role in the task of maintaining peace in the world.

For many years now, we have been steadily increasing the strength of our US airpower. The advent of atomic weapons in great numbers and variety, and now in megaton yields, has brought us to the point where the airpower we now hold poised is truly powerful beyond the imagination of man. But there comes a time in the course of increasing our airpower when we must make a determination of sufficiency. Now, sufficiency of airpower is not expressed accurately by such a phrase as 137 wings. The 137-wing program as conceived in 1953 was a considerably less powerful force than the 137-wing program we conceive of today.

Sufficiency of airpower, to my mind, must be determined

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period by period on the basis of the force required to accomplish the mission assigned. Because technological changes are constantly occurring, which alter the power of any force to execute its mission, we cannot assure ourselves of continuing sufficiency by adherence to an oversimplified phrase like 137 wings. We must constantly review our mission requirements and tailor our concept of sufficiency to the current and foreseeable needs.

There is no occasion in this audience to labor the point that the build-up of atomic power in the hands of the two opposed alliances of nations makes total war an unthinkable catastrophe for both sides. Neither side can hope by a mere margin of superiority in airplanes or other means of delivery of atomic weapons to escape the catastrophe of such a war. Beyond a certain point, this prospect is not the result of *relative* strength of the two opposed forces. It is the *absolute* power in the hands of each, and in the substantial invulnerability of this power to interdiction.

Under such circumstances, each potential belligerent in total war could possess what might be called a "mission capability" relative to the other. So great is the destructive power of even a single weapon that these capabilities can exist even if there is a wide disparity between the offensive or defensive strengths of the opposing forces. I believe we have this "mission capability" today. It is crucially important that we maintain the level of strength constituting a "mission capability." It is neither necessary nor desirable in my judgment to maintain strength above that level. Now the maintenance of a "mission capability" certainly cannot be achieved permanently by any combination of actions that can be taken today. We must work steadily, urgently, and intelligently to insure that the level of "mission capability" is in fact maintained in the face of technological and strategic changes in our world position.

Let me illustrate what I mean. If a potential enemy of the United States should, by some unforeseen technological breakthrough, accomplish, say, a two- or threefold increase in the effectiveness of his air defenses, we would be compelled instantly to reevaluate the force structure and the characteristics of the weapon systems which previously had constituted our "mission capability." However, it is not likely that changes in the technological status of airpower will occur in such a revolutionary fashion. We would expect them instead to be accomplished in an evolutionary manner so that reaction to them could be on an orderly basis. In any case, we must assure ourselves that at all times we have in hand what I have termed a "mission capability."

The problem before the world today is a problem of deterrence. War is neither outlawed nor outmoded. Rather, it has been made an unacceptable procedure even for the most immoral and ruthless of governments. The effective psychology of deterrence lies in making it completely plain to all that initiation of total war against the United States would promptly and inevitably result in the destruction of the aggressor.

Under present circumstances and until some whole new order is created, this, and this alone, is the guarantee against total war. It is unfortunate that the world is so ordered as to compel reliance upon the argument of annihilation to preclude this universal catastrophe. By the same token, it is unfortunate that there is evil in this world; and that some men are ruthless. But these are facts of life that the people of this earth have had to deal with in realistic fashion from time immemorial. To ignore these facts in this atomic age would be to invite disaster.

"The problem today is one of deterrence": Mr. Quarles.

The theory of sufficiency I have been discussing has its most obvious relationship to the problem of total war. Some say that this is its *only* relationship to the subject of war. I deny this. The capabilities which now make total war an unacceptable proposition to a potential aggressor can also make limited aggression unacceptable. The weapons now in our arsenal, linked with delivery systems of great speed and global range, are capable of visiting appalling destruction on military forces in the field as well as on strategic targets. The potential aggressor, contemplating a piecemeal-type of grab of the territory of the Free World, if confronted with the awful consequence of atomic counterattack, could not hope to succeed in his aggression nor to reap other than a highly unprofitable whirlwind in the process. No morality and no logic requires the defender to meet aggression with the same type of forces that the aggressor chooses to employ.

Now I think this subject of so-called "local" war has become somewhat confused by the various meanings attached to the word "local." Certainly I do not mean to imply that the United States must participate in every local disturbance around the earth. The question of US action turns on the nature of the disturbance; whether it is a truly local problem arising from local issues, or whether it is part of a basic Communist pattern of aggression against the Free World. So far as the Air Force is concerned, of course, the decision as to United States participation must be made by higher authority. Once it is decided, however, to inject US military force into the situation, we feel that the most effective weapons should be used as required from the outset.

If it were obvious that limited aggressions would be met with the full force of atomic weapons, I do not believe such aggressions would occur. As in the case of all-out war, if the Communist leadership were tempted toward limited aggression, but were faced with the plain fact that the United States stood ready to use its best weapons to defend its vital interests, they would have to conclude that such aggression would be unprofitable. Again, as in respect to total war, air-atomic power becomes a most convincing deterrent.

While deterrence is essentially a state of mind, deterrent strength is a reality, an ability to deliver in the showdown. Deterrence against massive aggression is the prime consideration, not only because massive attack is our most dangerous exposure, but also because a good defense against massive attack would probably provide

"Airpower as a deterrent is increasingly recognized."

a good defense against non-massive or peripheral aggression.

That the importance of airpower as a deterrent is increasingly recognized is shown by the fact that in the last eight years the Air Force share of defense expenditures has increased from less than one-third of the $12 billion level in Fiscal Year 1950, to almost one-half of the present $36 billion level, a five-fold increase in Air Force dollars. If naval aviation is included, we find today something like two-thirds of our defense dollar going for airpower.

We must be careful, however, to avoid an over-simplification of the problem. All of the elements of our military establishment are still important, and it is essential that we achieve a proper balance between them in the light of a realistic appraisal of the values which each can contribute. All must and all are making rapid adjustments to the realities of the atomic revolution. Whether or not there should be a continuing trend to increase the airpower share in the total is a matter for careful evaluation and judgment by our best military minds. But whatever the airpower share, we must continue to respect the contributions of all arms to the defense position. Our struggles with the Fiscal Year 1958 budget make it clear that we must determine what defense posture is necessary and sufficient in this very dangerous period and how it can be most economically created—not just to save money but because to maintain the necessary posture will probably at best require all the money we can reasonably expect the taxpayer to contribute to defense under the foreseeable conditions.

Within the Air Force one of the most difficult basic problems we have to face is that of apportioning our materiel resources between procurement of equipment for the inventory on the one hand, and development of equipment for future use, on the other. How much shall we spend for inventory production and how much for research, development, and test of better equipment for the future? And a related question: How frequently shall we replace the old with the new?

While again there are no categoric answers to such questions, success depends on wise judgment in answering. Currently, our expenditures for development of future equipment are about twenty-five percent and for inventory equipment about seventy-five percent of our total materiel expenditures, not including military personnel costs. Most businesses would consider twenty-five percent a very large fraction to devote to development. In our business the criterion must be the sufficiency of the force today and continuously in the future. Being ready in the showdown argues for infrequent changes of equipment because conversion from old to new cuts into operational effectiveness. This means that we should make long infrequent steps rather than short frequent ones.

One hears talk of the need for cutting down the time from inception of weapon development to stockpile availability. Reducing administrative delays in the development process is certainly important, but making many short steps is not the answer. The important thing is to see that long steps are taken and that the product finally standardized is at the forefront of the art. Developing a new plane in four years is not necessarily better than developing one in eight. The real test is how modern and reliable the new plane is when it goes into inventory.

While there are certainly exceptions, I am satisfied that generally speaking we make best progress by insisting on orderly development procedures. For example, "Fly before you buy" is a generally sound concept, not just to save money but because it produces the best operating results within the resources available and over the long pull. Of course, there are exceptions where valuable time can be bought, as by gambling on advance procurement of long lead time items. How far to gamble is a function of the values involved. In some cases of very high priority, such as our ballistic missile programs, long chances should be, and are being, supported.

There is no doubt that the judgments in this development area are among the most intricate and difficult ones we have to make. In spite of the very great efforts to organize and manage the program, I believe it is fair to say that none of us in the business are satisfied with it. There are promising lines of development that are not being pursued as vigorously as they should be, while others are being pursued in greater variety and complexity than their promise justifies. These are problems that are vital to our long-range qualitative position. With the very rapid technological strides that are being made by the Soviets, we cannot be satisfied with anything short of best utilization of our resources, and this calls for the concerted efforts of all of us working in this field, both inside and outside of the service.

In closing, I would like to repeat my conviction that we have today the best Air Force in the world; that its quality in men, materiel, and leadership surpasses that of any potential opponent. As General Twining said yesterday, "Our airplanes and equipment are the world's best. I was certain of this before my visit behind the Iron Curtain and I saw nothing in Moscow to make me change my mind." And again, "I am confident that if we continue the air programs we are now planning, we will not lose our air lead to the Soviets." I share General Twining's confidence. I am also well aware of the seriousness of the Soviet challenge and I am dedicated, as I know all of you here are, to carrying out the programs necessary to maintain our position.—END

THE HON. DONALD A. QUARLES

This was Mr. Quarles's first appearance at an AFA Convention as Air Force Secretary. He was named to the post last August, while the AFA meeting was going on in San Francisco. Earlier, Mr. Quarles had been Assistant Secretary of Defense for Research and Development. Born in Arkansas in 1894, he's a Yale graduate. He became a vice president of Western Electric and headed the Sandia Corporation before accepting his Pentagon job in 1953.

These outstanding airmen, shown here with Jimmy Stewart, were honored guests of AFA during New Orleans convention.

AFA HONORS OUTSTANDING AIRMEN

WHEN these men were introduced by AFA President Gill Robb Wilson at the Airpower Symposium luncheon in New Orleans, the entire audience and all those at the head table —including AF Chief of Staff Gen. Nathan F. Twining—rose and gave them the biggest hand of the day. An outsider may have been puzzled, for they weren't high government officials or famous in the usual sense. But the nineteen airmen chosen by the major commands because of their outstanding qualities to represent the USAF in New Orleans, were Very Important Persons at the AFA convention. They were selected by standards established by each command and they included a SAC B-47 crew chief, an ARDC scientific photographer, and an airborne radio technician stationed in the Philippines. Their selection was part of AFA's convention theme stressing the importance of technical manpower, and all nineteen (*listed below*) were honored guests of the Association at convention events.—END

George Kenney chats with M/Sgt. David Cochran of the Idaho ANG, left, and M/Sgt. Doyle Webb, AF Reserve.

ABLES, NORMAN E., *M/Sgt., 455th Fighter-Bomber Squadron, TAC, Bunker Hill AFB, Ind.*

ANDERSON, EDWARD L., *M/Sgt., 28th Logistic Support Squadron, AMC, Hill AFB, Utah.*

ARCHUT, LEROY E., *M/Sgt., Hq. Command, Bolling AFB, Washington, D. C.*

BEEMAN, DANIEL, *M/Sgt., 497th Fighter-Interceptor Squadron, ADC, Geiger Field, Spokane, Wash.*

BLOTNER, JOHN C., JR., *M/Sgt., Wright Air Development Center, ARDC, Wright-Patterson AFB, Ohio.*

BROWN, WILLIAM S., *M/Sgt., 20th Fighter-Bomber Wing, USAFE, Weathersfield, England.*

COCHRAN, DAVID, *M/Sgt., Air National Guard, Boise, Idaho.*

DELL, ALLAN O., *T/Sgt., 6604th Air Base Squadron, NEAC, Pepperrell AFB, Newfoundland.*

GLEASON, WESLEY S., *M/Sgt., Air Proving Ground Command, Eglin AFB, Fla.*

HATCHELL, CHARLES T., *M/Sgt., 2565th Air Reserve Center, ConAC, Pasadena, Calif.*

JUNCO, ANTONIO, *M/Sgt., Detachment 202, 3502d USAF Recruiting Group, ATC, Beckley, W. Va.*

LEWIS, ROBERT L., *S/Sgt., 441st Bombardment Squadron, SAC, March AFB, Calif.*

MOORE, ROBERT E., *M/Sgt., 1350th Motion Picture Squadron, APCS, MATS, Wright-Patterson AFB, Ohio.*

MUSK, ROBERT W., *M/Sgt., Air Force Academy, Lowry AFB, Colo.*

NEVELS, CLIFFORD F., *T/Sgt., CAirC, Albrook AFB, Canal Zone.*

SPARKS, LEON, *T/Sgt., 719th AC&W Squadron, AAC.*

VAN DERVORT, ROBERT W., *M/Sgt., FEAF, Clark AFB, Philippines.*

WEBB, DOYLE, *M/Sgt., Air Reserve, Longview, Tex.*

WIENEKE, KENNETH S., *M/Sgt., US Military Academy, AU, West Point, N. Y.*

Behind the Manpower Eight Ball

Gen. Nathan F. Twining

CHIEF OF STAFF, UNITED STATES AIR FORCE

I AM awfully happy that I have this opportunity to come down to this convention—in fact, I have never missed one of them when I was in the country. I have always looked forward to the Air Force Association convention as one real bright spot in the year, when I can get out and meet again some of my old friends in the service and in civilian life.

Of course, what is much more important than that is that these meetings are so highly instructive to all of us. The Air Force Association symposiums bring together outstanding authorities from all elements on the national scene. The Association deserves a lot of credit for its objective, progressive approach to important national problems.

Your Manpower Symposium this morning was most interesting. The ideas advanced by leaders in research, education, labor, and industry certainly give me renewed confidence in our ability to solve the Air Force's pressing manpower need, which I realize is only part of the problem.

And I think the Association has picked a very interesting spot for this year's convention. Besides being one of America's oldest and most beautiful cities, New Orleans is the locale of a military event unique in American history.

Here, as you all know, in 1814 General Andrew Jackson fought and won the last battle of the War of 1812. One thing that distinguished this engagement was that it was fought many days after the war was over. In fact, the Treaty of Ghent had been signed by the British and the Americans two weeks before the Battle of New Orleans was fought.

As far as General Jackson and the British attackers were concerned, the fight was still on—for the ship carrying the news that the war was over had not yet arrived in this area.

In a way, the situation has more than reversed itself in the last 142 years. Today it is conceivable that a great war could not only start, but the outcome could even be decided before the formal declaration of hostilities could be exchanged.

This is not news. What is news—or at least new—is the growing wave of public understanding. From an acceptance

(Continued on following page)

of our national policy of deterring war, our people have progressed toward the understanding of modern war itself. It is not widely realized that if war ever comes, an enemy could strike like lightning and the outcome could be decided just about as fast.

It has become obvious that we can no longer depend upon forces raised and trained and weapons produced after we are attacked. We have learned that if we are to deter war, we must deter it with force in being. If we are attacked, we must defeat the enemy with the men and weapons ready not only on D-Day but at the H-Hour.

It is equally obvious that success will depend not so much upon numbers of men or sizes of forces as upon our better use of better and more modern weapons.

So far, we have been getting better weapons. There is no question about that. Our airplanes and our equipment are still the best in the world. I was certain of this before my visit behind the Iron Curtain, and I saw nothing in Moscow to make me change my mind. But the Soviet trip did convince me that we must emphasize even more the vital importance of maintaining this position and staying ahead.

However modern our weapons have become, we must remember we are still a long way from the push-button stage. Our planes, bombsights, jet engines, radars, and radios do not operate by themselves nor do they maintain themselves.

So although modern weapons may give us increased defense with fewer men, the men must be better than ever before.

This need for better men identifies the number one problem in the Air Force. The rapid progress of our technology has made our weapons and equipment more complex to operate and maintain. This complexity has simply put us behind the manpower eight ball.

Here are two examples of what has taken place.

During World War II and right after, it was no problem to train combat pilots in new aircraft. Those of you familiar with the B-29 and the B-47 know how this situation has changed. In the B-29 cockpit, the pilot had about 130 buttons and gadgets and levers. If this was a lot, consider the B-47. Here the pilot watches, manipulates, and adjusts about 350 lights, dials, switches, and controls.

This provides a good indication of the increased knowledge, skill, and proficiency required of our combat pilots today.

The impact of technology on our personnel needs is even more apparent when comparing old and new electronics equipment, and here is a second example. Instead of the nine electronic systems of the B-29, there are fourteen to be maintained in the B-47. The number of electronic tubes has multiplied from 150 to 650. As a measure of increasing worth of competent electronics personnel, consider the rising costs. The price tag of the electronic systems in the two aircraft has risen from $8,000 in the B-29 system to over $200,000 in the B-47 system.

Even more staggering are the maintenance costs of electronic equipment. For *one year* they run as high as double the cost of the original equipment.

All these complex components make the success of any mission increasingly dependent upon the skill of the people who operate and maintain them.

We recognized this trend when in 1953 manpower levels were being decided for the growing Air Force. At that time, I felt that more than 975,000 military personnel might be required to man our planned 137 wings. After much discussion it was agreed that we could get by with 975,000 men if—and this was an important *if*—if each of these men were qualified to do his job, and that still goes. Our 137 wings cannot possibly be effective wings if they are manned by technicians of low skill and limited experience.

General Twining: "We can no longer depend upon forces trained and weapons produced after we are attacked."

Here is what is actually happening now. As of June 30 this year the Air Force had 131 wings activated. Of those wings, the majority were in the highest category of combat readiness, and we are proud of this. However, of the numerous wings not in this top category, eighty-two percent have not achieved peak readiness primarily because of a lack of qualified personnel.

From all this, you can see how much we must depend upon skilled operators and technicians, and why we need so many of them. Over the last five years, in fact, our requirements for technically trained people have increased twice as much as all other personnel requirements put together. These technically trained people are the ones we need and the ones we must retain. Unfortunately, those are the ones we find it hardest to hold.

The record shows that about eighty percent of the people we lose are skilled technicians or supervisors. Although the Air Force reenlistment rate has been rising encouragingly, we are now able to retain only one technician out of every three men that reenlist.

This is understandable, for it takes a higher order of aptitude to become technically skilled. Such men have more to offer with their skill and experience, and their opportunities on the outside increase.

I could go on documenting this problem and I hear it from all sides, all over the world. Every Air Force commander I talk with is more concerned about his shortage of qualified officers and airmen than anything else.

Now, what have we been doing about it?

There is a lot that we have been able to do within the Air Force.

Our recruiting effort has been completely reorganized and is doing a wonderful job both in attracting new blood and in helping experienced airmen see the wisdom of staying with us. To aid our recruiting efforts, the Air Force now offers airmen the opportunity to reenlist for the base of his choice. Furthermore, we are working hard to assign men returning from overseas to the base of their choice.

Last summer we tried a new idea. We offered qualified airmen the chance to be discharged and reenlist prior to the normal expiration of their terms of service. The reenlistment bonus encouraged many airmen to accept this offer, and the Air Force got a bonus too, I assure you.

"Although modern weapons may give us increased defense with fewer men, the men must be better than ever before."

More than ninety percent of the men who reenlisted under this plan signed up for six years' service rather than the minimum term of four years, and there the country and the Air Force both got a big bonus.

There are other steps we have taken to improve the attractiveness of an Air Force career.

We have increased the stability of individual assignments. Our men do not have to move their families and belongings so often now. More of those ordered overseas are moving by air instead of by water. This has a dual benefit. Our people find it easy and enjoyable to travel by air, and, more important, air movement shortens our personnel pipelines, freeing thousands of men for other useful duty.

We are increasing specialization. This cuts down the number of skills a man must learn. Instead of having one man trained in all components of a technical system, we train him in just one or two of the job phases. In this way we save time, and we get more usefulness from men who stay with us for only the one enlistment. Those who stay on, of course, learn much more.

We are making wide use of civilian personnel, both at home and overseas. While this has been a helpful program there are, of course, practical limits to the use we can make of non-military people in a combat-ready force, as you know.

We are also contracting with civil firms for certain maintenance and services. This reduces costs and saves on men in uniform.

The Air Force can do a lot by itself, but the really big help comes from without the Air Force. During the last four years, both the Administration and Congress have done much to help us solve our personnel problems.

The Reenlistment Bonus Act of 1954 has proved to be an important incentive. The Career Incentive Act of 1955 provided higher pay for military personnel and this helped.

During the current session of Congress the Dependents Medical Care Bill has passed. This will give us relief in an area that has been extremely troublesome. Decent medical care is certainly something we should provide for both our servicemen and their families.

The Survivors Benefits Bill will provide equitable financial security for dependents of servicemen.

We hope to be able to keep more of our good young officers as a result of the new Regular Officers Augmentation Act. A larger percentage of Regular officers has been authorized, and this has been a stabilizing influence.

These legislative actions all serve to make Air Force life more attractive.

Another important factor is housing. Our men expect and are entitled to a standard of living comparable to that enjoyed by other Americans. This is unobtainable on many of our bases. More housing will not only make a service career more desirable, it will also keep our most needed people close to their work and this means quicker reaction time in an emergency and much more increased combat effectiveness in the combat unit.

Congress has helped us here, and we hope to get more housing in the future.

So far, I have described remedies in effect, or in the mill. Many more things remain to be done, and most of them concern the same old problems.

We all know that there still remains a wide gap between the technically skilled airman's standard of living and that of his civilian counterpart. In peacetime, it is unfair to expect our airmen to plug the gap entirely with patriotism.

The Air Force still cannot offer nearly as much take-home pay for their skill and know-how as can private industry and, of course, we don't expect that. If our overall compensation could more nearly match civilian standards, we could have a much greater chance of keeping our trained people in the Air Force. We must be able to offer a worthwhile career to men of skill and experience.

Right now, Secretary of Defense Wilson has a committee studying the problem of retaining skilled technicians, and we are looking forward to the issuance of this committee's report. Without prejudging the findings of this committee, it seems to me that a pay raise—especially for highly trained combat crews, experienced executives and supervisors, and technically qualified specialists—would be a small price to pay for the increased effectiveness and combat readiness that we would gain therefrom.

The shortage of technological skill in this modern Air Force is serious enough, but it is only a part of a larger problem.

As was brought out in this morning's session, the problem of meeting our technological needs and broadening our scientific base is a most serious one.

We are challenged now, as we have never been in the past. Even before my recent visit to the Soviet Union I was well aware of this problem.

However, I must admit that I was somewhat surprised by the many indications of excellence and the thoroughness in the Soviet educational endeavors. Throughout our visit, we were continually confronted with evidence of Soviet determination to achieve technological prominence.

Now, in citing some of the things we saw during our visit. I want to emphasize that one does not become an expert during an eight-day visit. However, what we did see reinforced our previous evidence on the vast technical and scientific training programs going on in the Soviet Union.

I would remind you that all our tours were tightly controlled, and we were permitted to see only the items that they wanted us to on their carefully planned agenda. Our hosts, though cordial and hospitable, were extremely reticent to give out information. They were masterful at sidestepping or ignoring questions while maintaining an air of cautious courtesy.

Their airpower and engine designers, however, seemed a bit freer in their conversations.

At one of the receptions, I told one of the Soviet leaders that I would like to meet Mr. Tupolev, one of their top designers. He is responsible for more than twenty Soviet aircraft types, including their copy of our B-29.

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I saw one of these TU-4s, a copy of our B-29, taxi up at one of the airfields. It was a somewhat startling sight, a perfect replica in every sense of the word.

They brought Mr. Tupolev up to my table, and I started to talk with him about the Bison, that's their long-range jet bomber. Specifically, I questioned him about the engines, and the amount of thrust. He would not give the slightest indication of their power.

When he was on a trip to Great Britain the following statement was made to him: "Well, they must be very powerful engines because the air intake is so big. The air intake is much bigger than I expected."

His answer was good.

He said, "I am sure you know that you can't tell what's in a man's head by the size of his mouth."

In spite of this reluctance to provide information on weapons, aircraft, or tactics, they were obviously proud of their educational system and their ability to turn out scientists and engineers, and they have some good reasons to be proud.

For example, we saw the Moscow University. While we did not go through it, we drove all the way around it. It is a really huge institution. One part of this university is an Academy of Science. This academy is devoted solely to the teaching of the physical sciences. In this one science academy alone there are 20,000 Russian students, and this is just one school of a pretty wide system of engineering and science colleges.

In Russia considerable incentive is provided the students. We were told they were paid 400 rubles a month and if their grades were superior, they got 600 rubles a month, a pretty good salary by their standards.

Further incentive is the high esteem enjoyed by top scientists and engineers.

We were repeatedly impressed by the Russian leaders' going out of their way to pay respect to and call attention to their aircraft designers and production engineers. At one of the receptions, Dementer, the Soviet Minister of Aircraft Production, was called to Mr. Bulganin's side. Bulganin then clearly showed his high regard for this man by kissing him several times on both cheeks, a traditional means of expressing great admiration.

I doubt if that system would get results here in the United States, but it apparently works fine in Russia.

As airmen, we were particularly impressed with the way the military requirements for technical personnel are met. The Zhukovskii Air Engineering Academy was very interesting. At that school, 2,500 Soviet Air Force officers are taking a five-and-one-half year course. The Academy provides very complete facilities for study and research at high level, and specializes in aeronautics just as European universities used to specialize in humanities. A graduate of this Academy who knows something of our educational system in the United States said their work is comparable with that of post-graduate courses in our colleges, and that school is just teaching members of the Air Force.

General Irvine, our Deputy Chief for Materiel, was highly impressed with this school from the viewpoint of the maintenance man. He could not get over the idea of how wonderful it would be to have a steady supply of 500 aeronautical engineer-Air Force officers a year. This would solve one of our most critical shortages and would give us an advantage we do not have now—particularly in the maintenance and operations of the modern aircraft we have coming off the production lines today.

Since details of my visit have been covered, in two previous public reports [*see* AIR FORCE *Magazine, August '56*], I will not go further in them today, but I did want to leave with you the confirming impressions I gained during my brief visit.

It is clear that the challenge facing us is great.

As I have said before, I feel the Soviets are capable of tremendous growth and advancement in the years ahead. They are moving forward across a broad technological front.

I am confident that if we continue the air programs we are now planning, we will not lose our air lead to the Soviets. But I found too that the Soviets are pretty confident.

In a conversation just before we left Moscow, one of their top designers told us we can expect further advances in Soviet aircraft performance in the future.

He said, "We are doing some very interesting things with engines for high speed—I think maybe we could teach you people a few things."

I find this prediction interesting, but not alarming. We too are under way on high speeds and on new "things."

We have had a spectacular example of this within the last few days. Last week one of our group of courageous and skilled Air Force test pilots flew a research plane on a test flight designed to probe the so-called heat barrier. During his flight he went faster than man has ever been known to fly.

[General Twining here was referring to the new, unofficial world speed record set July 25 by veteran test pilot Lt. Col. Frank K. "Pete" Everest, Jr. Colonel Everest flew the experimental rocket plane, the Bell X-2, more than 1,900 mph—close to three times the speed of sound—over the southern California desert, near Edwards AFB. For his work in exploring the thermal barrier Colonel Everest received the Air Force Association's Flight Award for 1956 at the Airpower Banquet (see page 82) the day after General Twining's remarks.—The Editors.]

Flights like these are more than spectacular. And they are more than outstanding demonstrations of the great courage and skill of the men who make these tests.

They are also milestones in the march of aviation progress. From these tests we get the valuable data needed to design and produce the planes, weapons, and equipment we must have in our combat units in the years ahead.

While these outstanding feats of test and development are important, I want to remind you once again that continued progress depends upon people, trained, experienced, skilled people in science, industry, and the military services.

We speak continually of the importance of technological breakthrough, and I know of no single breakthrough that I would trade for the assurance that the Air Force would get—and be able to keep—the skilled men it needs in the years ahead.

However, I realize that the needs of the Air Force are only one part of the problem. The Army and Navy face similar difficulties. So does the industry.

It is a national problem. It must have a national solution. I assure you that the Air Force will lend all conceivable support to achieving this national solution.

The security of our nation in the years ahead depends as much on the wisdom and skill of our engineers, scientists, and technicians, as it does on the courage of the fighting men in our Army, Navy, and Air Force.

We have learned the hard way that military strength is vital to our security. We have acted on that lesson.

Let us not have to learn the hard way an even more important lesson—that a broadening scientific and technological base is equally vital to continued peace and progress in the years ahead.—END

The Shortage of Scientists—A Problem and an Opportunity

Dr. Alan T. Waterman DIRECTOR, THE NATIONAL SCIENCE FOUNDATION

I AM HAPPY to bring to members of the Air Force Association greetings and congratulations on the occasion of your tenth anniversary. It is most gratifying that so influential an organization as the Air Force Association should have chosen to devote its annual Symposium to the discussion of a problem that is uppermost in all our minds, namely, the question of scientific and technical manpower. For although we in the federal family acknowledge that the government has definite responsibilities with respect to this problem, we feel that its ramifications are so numerous and so widespread that only the energetic and intelligent effort of individuals, private organizations, state and local groups, coupled to those of the federal government can bring about satisfactory solutions.

Your basic theme, "Manpower in the Jet Age," is well stated, for the Jet Age goes back only a decade and a half, and in that brief time most of the manpower problems that we face today have emerged.

If we had been sufficiently prophetic at the very beginning of the Jet Age, we might have avoided the present dilemma. Since we were not, we can only hope that we shall act with sufficient foresight and wisdom now, so that the age of atomic power, or solar power, or whatever ages the future may hold will not also be pondering a shortage of scientists and engineers.

I have been asked to set the stage for today's discussion by outlining the national problem. The problem has two major aspects. The first is: How can we as a nation fulfill our continuing objective of providing our young people opportunity for education up to their highest skills and talents? And, second: How can we meet the immediate as well as the long-term problem of providing adequate numbers of scientists and engineers in an age of rapid technological progress?

The second aspect of the problem, in particular, is by no means exclusively our own; the world is experiencing a technological revolution; and although it may be in different stages in various countries, most nations are keenly aware of it and are making an all-out effort to increase their numbers of scientists and engineers. We are constantly warned that the Soviet Union threatens to outstrip us in the numbers of technically trained people it produces, and it is important to realize the implications of this possibility. Furthermore, the Soviet Union identifies those with aptitude for science and sees to it that they carry on intense training to actually become scientists and engineers. On looking at education and training in the sciences in our own system, we find on the other hand that mathematics and sciences are more or less avoided by the average boy and girl in school and that many students with high aptitude for sciences and other disciplines as well do not choose to develop these attributes by college and graduate school education.

We must bear in mind, however, that our objectives may differ in important respects from those of other nations so that we should first look at the problem squarely in terms of our own national needs and goals.

Only last month, the Department of Commerce announced that the gross national product has for the second time passed the $400 billion mark. President Eisenhower has confidently predicted that within the next ten years the $500 billion level will be reached. Science and technology have played an increasingly important part of this tremendous economic advance.

The National Science Foundation has completed a survey of science and engineering in American industry which is soon to be published, and which indicates that private industry performs about two-thirds of all research and development in the natural and engineering sciences conducted in the United States. In the survey year, 1953, industry's research and development activities, including government contracts, cost approximately $3.7 billion out of a total of more than $5 billion. Thus, the majority of all the nation's scientists and engineers as a total are employed by industry.

A look at how the nation's 250,000 scientists and 700,000 engineers are apportioned among industry, education, and the government shows that industry has about sixty percent of the scientists, education about twenty percent, and government about twenty percent. These are metallurgists, chemists, research scientists, physicists, mathematicians, biologists, and astronomers.

And of the engineers, seventy-five percent are in industry, about two percent in education, and about twenty-three percent in the government.

As a nation, we must be concerned that the needs of the three consumers of technical skills—industry, education, and government—are adequately met. Our economic strength as well as our military strength depend upon it, and clearly both are involved in our national security. The problem we are facing today is: "What can we do to assure a continuing supply of these vital skills and to prepare to meet the needs of the future?" We know that we must provide a good educational system with competent instruction in science and mathematics, beginning with the secondary school and going straight through graduate school. We realize that there must be adequate support and encouragement of basic research, not only as the source of new knowledge and technological breakthroughs, but also because basic research is the only means whereby talented young scientists and engineers can acquire the training that they must have if they are to become truly creative in their fields.

We know these things quite well, and so the real question becomes: "What are we doing about them?" This morning you will hear from my colleagues on this platform from education and industry and so on, as to the situation and about what we might possibly do. A great deal is said in the first place about critical shortages of scientists and engineers, but not enough that is specific and there-

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Jimmy Stewart, known to millions of movie fans, but better known to those close to airpower as one of their own, was moderator for the entire Airpower Symposium on August 3. Jimmy is a charter member of the Air Force Association, and is an active member of the AF Reserve, holding the rank of colonel.

fore helpful. A really accurate statement is that there are critical shortages in some, but not in all, fields, and that there is a constant demand for highly qualified personnel in all fields of science and engineering.

In the industrial survey of which I spoke, interviews were held with officials of 200 companies, which together employ more than half of the number of research and development scientists and engineers on company payrolls. At least half of the companies reported that they were unable to hire enough research scientists and engineers to meet their needs; one out of every three reported major or substantial shortages, and companies which reported they had been able to fill their requirements all emphasized their need for better qualified applicants.

The need for personnel seemed to be most widespread among aircraft, electrical companies, petroleum, paper, food, and primary metal companies. The proportion of scientists and engineers engaged in research and development is highest in the aircraft industry. Fields in which officials reported a need for additional personnel included chemical, electrical, mechanical, and aeronautical engineering fields, and the sciences, chemistry, physics, metallurgy, mathematics, and others. The need extended to all levels of training although most company officials said they had greater need for personnel with experience or advanced degrees than for new graduates with only the bachelor's degree.

From other sources come further indications as to the nature and extent of the shortages. Mathematicians, for example, are high on the list of shortages, and a report has recently reached us that one aircraft company is paying a "bounty" of $100 a head for every mathematician! International Business Machines estimated in 1953 that at least 1,500 applied mathematicians would be required to man and maintain computers that they had installed or that were on order. This year, IBM estimates that 7,500 mathematicians will be needed to man computers on order, of whom about 1,500 should be Ph.Ds.

How does this compare with output? About 250 Ph.Ds in mathematics, or about one-sixth of the estimated need for computers, will be graduated this year; and the worst of it is, as our program director for mathematics puts it, "All but a few of these 250 don't know a computer from an eggbeater." I would add that some of them wouldn't even know what an eggbeater is.

I do not need to stress to this audience the increasing importance of high-speed computers, but we do need to bear in mind that this is only one of a number of areas where trained mathematicians are urgently needed.

Physics is another field in which the shortage is conspicuous. The trend in the employment of physicists has been an interesting phenomenon. Fifteen years ago the majority of physicists were engaged in research and teaching in our universities. Today over half of them are employed by industry. Nearly half the total number of physicists employed in private industry are in the aircraft and electrical equipment industries. By the way, an interesting comment on this employment of scientists and engineers in industry is that by no means are all of them engaged in research and development; nearly half are not.

The Placement Register, sponsored by the American Institute of Physics at its annual meeting in New York last winter, reported that more than 200 recruiting organizations offered over 2,000 jobs. Of the total number of 308 applicants, fifty-seven were students, and eight were unemployed, or a total of sixty-five applicants who could be employed without creating additional vacancies—only sixty-five!

The most publicized fields of shortages is, of course, engineering. As the result of a recent special survey of 414 industrial and governmental organizations, the Engineers Joint Council finds a rise in demand for engineering graduates in 1955 and 1956 substantially above that in any year since 1951. After cautiously balancing the number of complex factors involved, the Council concludes, ". . . the data would seem to warrant the assertion that the situation would be considerably eased if the total number of engineering graduates this year were of an order of magnitude between 35,000 and 40,000." Our own estimates indicate engineering graduates for 1956 to be of the order of 30,000.

Thus far the data I have given relates to the needs of industry. I have said nothing about the needs of our universities, which are very important, and of the federal government, including the armed forces, where scientists and trained technicians have an increasingly responsible role. Our studies of manpower in these two areas are as yet incomplete, so I do not have firm figures in these categories, but it is significant that the employment of physical scientists and mathematicians by the federal government has more than doubled since 1947. Incidentally, in 1954, more than 1,600 military officers received graduate training in the physical sciences and engineering in full-time civilian institutions.

In the educational field, which will be discussed in more detail by General McCormack, the outlook for the future is one of rapidly increasing college enrollments and hence for a proportionately higher number of graduates in science and engineering. But the increase in college enrollments, conservatively estimated about fifty percent greater in 1965 than at present and at least doubled by 1970, induces a concomitant need for teachers and trained research investigators.

There may be a need for about half a million faculty members in our colleges and universities by 1970. At the present time there are about 200,000 faculty members in our colleges, of whom between 50,000 and 60,000 are teachers of science, mathematics, engineering, and related subjects. A total of more than 600,000 high school teachers may be needed by 1970. At the present time, about forty percent of high school teachers are teaching science or mathematics. Staffing our schools in the future with well trained science and mathematics teachers will draw heavily upon our total graduations.

It will be apparent to all that there must be a general effort to increase the supply at the source by encouraging more able young people to go to college and by strengthening the material rewards as well as the pres-

tige of teaching in the high schools where the important groundwork for future training is obtained. Industry must face up to the fact that trying to fill immediate vacancies by raiding not only the colleges and universities but the secondary schools of their math and science teachers will simply create far greater problems for the future. The National Association of Manufacturers have a number of suggestions on how companies can contribute to tomorrow's scientists and engineers by effectively helping the scientists and high school teachers of today.

Industry can and is helping the teaching situation in many constructive ways, and these efforts should be expanded. A number of industrial research laboratories offer summer jobs for teachers which not only help their chronically low financial condition but also bring them into contact with new developments in science and engineering. Industrial support of summer institutes for high school and college teachers of science and fellowships for teachers are other useful ways in which to help.

I am happy to report that our interview program among the 200 industrial companies indicated widespread recognition among officials of these companies that well qualified teachers, especially in secondary schools, are essential to the solution of the problem of providing better training as well as generating an interest in science among students. Suggestions were most often directed toward higher teaching salaries and better trained teachers. A number of officials also stressed the importance of broadening science curricula in recognition of the growing need for knowledge and versatility in more than one field. One official suggested the inclusion of courses in the humanities in the training of young scientists. I have observed in my own experience that the technical industries understand the problem well.

Let us turn now for a moment to the question of basic research. Not only is a solid foundation of basic research fundamental to an expanding and healthy technology but it also plays an essential part in the training of scientists and engineers, as I have said.

Of the federal funds for research and development which now constitute a major part of the national research and development effort, only seven percent goes for basic research. In 1953, only five percent of the total cost of industrial research and development went for basic research and study.

The aircraft and electrical equipment industries far exceed all others in the scale of their research and development programs. The estimated total cost of research and development in these two industries taken together was about $1.5 billion in 1953, or two-fifths of the grand total for all industries. These two industries also stand near the top of the list in terms of the dollar volume of basic research, with projects costing $18 million and $19 million, respectively. Nevertheless, basic research in the aircraft industry represents only about three percent of the total research and development cost. That's below the average and below what the federal government is doing.

In commenting upon this discrepancy, President James Killian of the Massachusetts Institute of Technology remarked: "The aircraft industry, as this committee knows, far exceeds all other industrial groups"—this was before the Senate Subcommittee investigating airpower—"far exceeds all other industrial groups in the total expended for research and development. It nevertheless spends for basic research a smaller percentage of its total research and development budget than the average percentage for all industries. I respectfully suggest that in an industry so dependent upon innovation and sophisticated technology and so receptive to new ideas, this imbalance should be temporary."

Encouragement and support should be provided for basic research across all the fields of science, if only because it is impossible to predict in what area a capital discovery may be made. History is full of examples. Special emphasis should be placed on those areas of research where fuller knowledge and factual data are needed, since modern engineering advances are dependent upon up-to-date research data. Above all, increased support should be provided primarily to colleges and universities, the natural habitat of basic research, where the large majority of basic scientists are employed and where the advanced training of future scientists and engineers takes place. Universities and colleges have benefited greatly from grants and contracts for basic research; the universities commonly thus providing both research training and financial aid to a group which a year or two later will become available in the labor market.

Who is to furnish the additional support needed for basic research? I think we would agree that both government and industry have a responsibility. Our colleges and universities have been greatly assisted by the extensive program of grants and contracts for research and development that has evolved since the war. However, we must realize that, generally speaking, basic research and education are their major functions and that support for these is the most effective way of meeting present and future needs. Both industry and government should fully realize this and plan accordingly. Except in departments of engineering, agriculture, and medicine, academic institutions should not be urged to undertake applied research and development except on an ad hoc emergency basis.

One of the responsibilities of the government in which industry can be helpful is maintenance of a proper balance between basic research and applied research. At a time when progress in technology is critical, funds are much more readily available for direct applications of science, and the support of basic research, so important in the long run, is apt to be neglected. You know, one of the definitions of basic research is the research for which you can't get money. This is the present danger. The programs of many agencies with contract research now include a certain portion of funds for fundamental work related to their missions, and this is to be encouraged. To the National Science Foundation falls the responsibility for the support of general purpose basic research.

We have made grants to some 2,000 research projects in the five years of our existence for a total of about $24 million in this general program and have awarded more than 3,600 fellowships. Recently we had a program called "Education in the Sciences," which is similar to that which many industries are doing so successfully in support of the various sciences. In particular, we have supported this year twenty-five summer institutes for science teachers, attended by some 1,250 teachers. These institutes have disclosed some of the handicaps under

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DR. ALAN T. WATERMAN

Doctor Waterman is Director of the National Science Foundation. He was born in Cornwall-on-Hudson, N. Y., and is a graduate of Princeton. Between World Wars I and II he was on Yale's faculty and from 1942-48 he was with the Office of Scientific R&D.

which teachers are working. An example is the case of a biology teacher who was attending our summer institute in astronomy because she has been assigned to teach astronomy the next year to teachers!

The Foundation and the Atomic Energy Commission have jointly sponsored, and are doing it now, two summer institutes on nuclear engineering for engineering college faculty members; one at the Argonne National Laboratory, and the other at Brookhaven National Laboratory. This is important if we are to have a sufficient number of scientists and engineers to man the new reactors, accelerators, and a variety of other developments in nuclear fields, we must train teachers again in this.

Many efforts similar to those of the federal government in support of basic research, in furtherance of the training of scientists, and in the improvement of teaching—can and are being carried on by industry, and of course by the private foundations, as well. The need is so great that the responsibility must be shared by government, industry, private foundations, and other groups. Recent action by seven university presidents in setting forth guiding principles for industrial gifts offers a useful pattern by which corporation gifts to academic institutions can achieve the maximum benefits.

The appointment, by the President, of the National Committee for the Development of Scientists and Engineers is an interesting step because it provides an action committee, not a planning committee, through which many ideas for meeting the needs for scientists and engineers could be carried out. This committee, which is headed by Dr. Harold L. Bevis, president of Ohio State University, met for the first time in May of this year and is now at work on a series of working groups to act upon long-range, as well as immediate, aspects of this problem. I am sure the committee would welcome the interest and backing of the Air Force Association.

One hopeful note in the whole situation is the growing awareness everywhere of the need for decisive action if our society is to produce the scientists and engineers it requires. Whenever our people become thoroughly conscious of a need to be met, or a job to be done, they generally roll up their sleeves and do something about it. We can expect, I think, that a great deal of good ultimately will result from the critical aspects of the present situation, because in order to train enough scientists and engineers, we must first strengthen our whole educational system and provide much stronger incentives for good teachers. These are things that we must do, regardless of the special needs in certain fields.

Finally, there is a positive side to the whole matter which has been excellently stated in the Interim Report of the Joint Committee on Atomic Energy's Subcommittee on Research and Development. Commenting on the shortage of scientific and engineering manpower, the report notes:

"It is important to recognize at the outset that these serious shortages are not a sign of failure but an indication of startling success. A way of life has been created in which the demands made for superior skills in every field have become constant elements of the normal pattern. A society has been created in which progress is not simply a matter of occasional spurts and short-term crises. Rapid progress has become a normal part of our national life, and the skilled manpower to keep up with this steadily and rapidly advancing march of progress will be in demand for years to come."

After Dr. Waterman's remarks, two members of the Symposium Panel (see cut, page 63)—Dr. Leon Trilling of MIT and Nicholas DeWitt of Harvard's Russian Research Center, conducted a discussion of the Russian manpower situation.—The Editors

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Dr. Trilling: Dr. Waterman just gave us a very graphic and comprehensive description of the technical manpower situation in the United States, and we would like possibly to make some comments and give you some data about what goes on on the other side. In this connection, when we evaluate manpower, we must discuss the quantity, as commented, the quality, and also how they are motivated. We hope to have a few things to say about each of these points.

Now, it seems to me in reality that there is not just one, that there are several manpower problems. There is the problem in finding enough executives and administrators and over-all planners. There is the problem of finding enough scientists, designers, and engineers. There is a different problem in connection with some professional skills—skilled personnel such as draftsmen, computers, technicians, foremen, maintenance crew chiefs, and so forth. And, finally, there is still a fourth problem in connection with skilled and semi-skilled labor.

When we compare the situation in the United States and the USSR, we will find that the comparison gives different results for these four different categories, and I think in the discussion, we will try to examine several of these problems separately.

Now, as Dr. Waterman pointed out, we are going through a technical revolution or at least a very greatly accelerated growth in our technical knowledge and, particularly, in the field of defense where all the latest information is immediately put to use. The margin between the boundaries of knowledge and the obligations of that knowledge, has decreased to almost nothing, so that increasing numbers of increasingly qualified professional personnel are needed. To illustrate this point, in the aircraft industry, there seems to be about one engineer for every six workers in this country, whereas in industry as a whole, the number may be closer to one in twenty or twenty-five. I mention this figure in passing to stress the importance of the professional, technical manpower problem, and I think that Mr. DeWitt has quite a few figures of the state of the technical manpower situation in the USSR.

Mr. DeWitt: In the last few years, most of you have probably heard and repeated warnings that Russia was proceeding rapidly with her build-up of constructionalized manpower resources and that this build-up was presenting a growing threat to American technological and scientific superiority.

It has long been a copybook maxim that "knowledge is power." Perhaps we always held this to be so, but because we Americans have had a remarkable facility for taking our advantages for granted in the past, we pay little attention to the things happening in the Soviet Union where this maxim "knowledge is power" has been indeed a guiding motto for the last three decades. Therefore, in recent years, it was a surprise to us to discover the reality.

During the last twenty-five years, the Soviet population increased from about 160 million to about 200 million in 1955. At the same time, its primary and secondary school enrollment increased from about ten million to about thirty million, the approximate enrollment at the present time. The number of teachers in primary and secondary rose from 250,000 way up to well over one and a half million. The number of science teachers rose from roughly 40,000 to over 350,000.

Symposium panel of experts on Russian manpower, from left: Nicholas DeWitt, Russian Research Center, Harvard; Leon Trilling, Department of Aeronautical Engineering, MIT; and Alexander Korol, Center for International Studies, MIT.

Enrollment in higher education establishments rose from 180,000 to close to 1.9 million. I mention all of those figures because I think that they clearly suggest that as far as educational progress in general is concerned, the growth of Soviet facilities of higher education, and consequently of trained manpower, has been substantially greater than the rate of global population.

During the last three decades, Russia has emerged from the position of a backward, illiterate country to the position of the second largest industrial power in the world. While the Soviet's industrial output and gross national products are still less than one-half of the United States's, it was able to devote upwards of five percent of the national product to education.

The illiteracy rate sank from thirty percent to twenty-five percent. The minimum number of school years completed by industrial workers and employees increased during the last two decades from less than one year to almost six.

In 1955, the Soviets had an army of engineers close to 550,000. The number of medical doctors is running now at about 300,000; agricultural specialists close to 200,000. Those are the figures which Soviet leaders boastfully point out as did Mr. Khrushchev in his speech in December of 1955 to the students at the University of Rangoon when he said, "Every year the Soviet Union graduates more engineers, agriculturalists, doctors, and other specialists than does the United States of America."

To this, one can add that according to the figures which became recently available after a survey of the Joint Committee on Atomic Energy, it seems that the Soviets are graduating at a rate not only greater than the United States but at a rate greater than all other countries combined. During the last twenty-five years, the total number of persons who completed their education in the Soviet Union, persons who are primarily employed in professional occupations, increased from roughly 280,000 to 42,000,000. While the total number of persons who completed higher education in the Soviet Union is still substantially below that of the United States—it is less than half of our number of college graduates—the Soviet Union has reached the position of close numerical comparability in scientific and technological fields with the United States.

The drive to increase Soviet manpower at a rate greater than their labor force and that of population continues to be a long-run objective of Soviet planners, and they desire to improve already existing technology with new industrial technology. The success of this undertaking is still regarded as being largely dependent upon future additions of formally trained specialists. Last July, Soviet higher education establishments graduated 265,000; that is still about fifteen percent less than we did—of whom, however, 70,000 were engineers, 26,000 were in agricultural fields, and 25,000 were medical doctors. All of those figures together are better than double, on a numerical basis, what we are graduating this year. All in all, of the total number of graduates from the Soviet higher educational establishments this summer, well over 160,000, or better than seventy percent, were scientists and engineers.

What is the picture for the future? During the next five years, it is possible to estimate that Soviet engineering higher educational establishments will graduate about 120,000 people which is again about triple our rate. Those figures clearly suggest that numerical and quantitative trends are definitely against us.

Now, finally, what are the measures by which the Soviets were successful in recruiting this professional manpower? I have sketched out four points. The first point is: The Soviet Union has a strong and persistent policy to promote all kinds of formal education. It heavily emphasizes scientific education on all levels; primary, secondary, and higher education. This educational policy emphasizes the needs of the state, its economic and military power requirements.

Although an individual may, and sometimes does, benefit from this educational policy, the welfare and benefit of each individual who receives such training are secondary.

The second point in accordance with those objectives: The Soviet Union operates a system of schools which are government-owned and centrally controlled. This structure resembles European educational systems, particularly the German one. Although the Soviets profess a mass-educational system, their system is quite a selective one. In their ten years of primary and secondary schools, one-fifth of the entering students succeed in graduating after ten years of schooling. Of those graduates, one-third succeed in gaining entrance to higher educational establishments, only six succeed in graduating. Through this stringent selection, the state succeeds in weeding out the less competent, and its standards of learning, in my opinion, are being upheld, at least to some extent.

The third point: The Soviet educational system is entirely tuition-free. In addition, institutions offer specialized training, either on secondary levels, in professional higher-education programs, or on the post-graduate level. They have an elaborate system of differential living allowances and scholarships for all successful students. The outstanding students receive bonuses. In addition to this, there is a heavy differential which gives an advantage to everyone who enters the field of science or engineering. Thus, the system is selective while at the same time, it provides a monetary incentive for students even while attending semi-professional schools or higher-educational establishments or while taking post-graduate training.

Finally, since the entire educational system is operated by the state, the state can easily decide the enrollment quotas in any specialized field. Thus, if the state chooses to train engineers at a numerical rate twenty times higher than the rate for training lawyers, it can do so.

As in the case of the Soviet investment of material resources for the build-up of producers, goods, and industries, the dominant share of the manpower training effort is devoted to suit the needs of the industry. As

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a result, over the last decade, the figures we have suggest that well over two-thirds of graduates of Soviet higher-educational establishments at a professional level have been in engineering and science fields, although one-half of the graduates of semi-professional schools have been trained for jobs in industry, and over four-fifths of all new labor trained for skilled or semi-skilled jobs are trained for the industries.

I would like to conclude this sketchy presentation of the quantitative accomplishments in the Soviet specialized manpower with two thoughts: First, the international situation being what it is today forces us to keep first in mind that Russia is a growing industrial giant that is well past the stage of infancy. Though it is a hard fact, it has first to be faced and cannot be discounted; this, however, should not alter our aims. We should not let ourselves be engaged in a blind numbers game. The Soviets have their own problems and we have ours. We operate in vastly different social and political and economic frameworks.

We should face our problems of engineering and scientific manpower on our own terms, and we should exercise caution and intelligence in the program to alleviate this shortage.—END

The Needs of Education in the Manpower Shortage

James McCormack, Jr.

ASSISTANT TO THE PRESIDENT, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

IN THE field of education where I have so recently arrived, there are some problems of the educator that need speaking of clearly and without inhibition. My brevity of experience perhaps qualifies me to speak with pure ambitions, unlikely to accompany the remarks of one longer in the business and who has learned more of the frustrations.

My remarks will be identified, of course, mainly with the training of scientists and engineers, but it will be readily apparent to all of you that most of the problems I mention in the field of technical education are really a reflection of the broader problems of education generally in the country.

Just three years ago at the AFA convention that year in Washington, I was privileged to explain to this group and many of its members about the then-new and modestly controversial weapon systems concept as applied to the development of new aircraft and missiles. On the rostrum with me that day, in addition to Mr. Hayes who is again here today, was Lee Atwood, and in the front row was J. H. "Dutch" Kindelberger, the respected president and board chairman of North American Aviation, respectively. Dutch listened especially attentively to my remarks, and I was pleasantly surprised later to find them printed in their entirety in the North American Company's magazine. North American really understood weapon systems and has known how to go about them since that day. In three years, the market value of North American stock has increased by something more than 350 percent. The connection between my advice and the company fortunes is, of course, apparent. General Rawlings will forgive me for taking all this credit, I am sure.

Having been given the chance to explain about education today, I would hope that the net value of the American educational system goes up similarly in the next three years. Asking a little over 100 percent per year might be a little much, but, quite seriously and honestly, the problem is to increase its worth 100 percent in from five to ten years.

The present elementary school enrollment is approaching thirty million in the country and is rising at a rate of about a million a year, or maybe more. There is no speculation at least for the next six years as to what is going to happen to these figures because these are the kids you can count right now, the one in the crib or the one running around the house making noise.

Present high school enrollment is approximately seven and a half million. During the course of the next fourteen years, the present bassinet and backyard set is going to thread its way on through the lower grades and move into the column going to high school. In that period of time, high school enrollment will just about double what it is today; it will approach some fifteen million.

The number going to college, of course, is a matter where more of the element of doubt enters. In 1900, one out of twenty-five high school graduates went on to college. Now, it is one in three. Somewhere, of course, this fraction will level off, perhaps between the present one-third and perhaps one-half, although I am sure that we all hope that the number won't be arbitrarily fixed low for lack of facilities of education. But, if it levels off between one-third and one-half, then college enrollment ten or fifteen years from now will range from four to six million; and last year's college enrollment was somewhat less than three million.

Many implications, of course, attend this oncoming flood. I propose to draw on this occasion only the one simple conclusion: That the need is very large and very urgent; it is continuing for classrooms, equipment, and, most important, for teachers, necessary to man the establishments of education.

These numbers that I have given you, of course, do not reflect present deficiencies in numbers of teachers or inadequacies in salary scales, or deficiencies in equipment, or the increasing cost of replacement and obsolescence, particularly in the equipment for teaching science and engineering. We will touch on some of these other points as we go along, but I would remark, however, that the correction of these physical deficiencies, while expensive, is at least straightforward. Correction of some of the other deficiencies is considerably less so.

In 1900, scientists and engineers in the US industrial working force comprised about one in 250; today the figure is of the order of one in sixty, a four-fold proportional increase in scientists and engineers in the industrial working force. Today the era of what is sometimes called automation is just dawning with all of its economic, political, and sociological overtones. The next generation will see not only a decreasing use of unskilled labor and a corresponding increase in skills—a point on which Al Hayes will touch very meaningfully when I get down—not only a corresponding increase in skills but an enormous increase in the requirements for the scientists, the engineers, the highly qualified professionals, who can visualize the new and qualitatively different ways of doing both old and new tasks, and who have the capabilities and professional competence to translate these visions into the realities of machines and the systems to do the jobs.

These people, these men and women particularly, are the ones for whom industry, and our society generally, look to the colleges and universities. As a practical matter, there are no other sources, and it should be remarked that industry with its very great need for the products of this system is the severest competitor of the universities for the teachers.

Having spoken of quantity, let us turn and say a few words about some of the aspects of the present system which bear on the quality of the product. I should say, however, at the beginning that no matter how thinly you slice it out, how finely you divide the individual deficiencies, they all relate in greater or less degree to one major gap, and that is the shortage of good teachers which is highly important. The growing urgency, as well as the magnitude of the task, is a shortage which is growing worse.

In 1900, one out of two high school students in this country took some math; now, it is one in four. The 1900 figure in geometry was one in four; now, the figure is one in eight. In physics, the trend is even more discouraging. It has gone down from one in five to one in twenty-five; and chemistry doesn't do much better; it attracts only about one in fifteen.

In contrast—to steal some of the thunder from our eminent panel—in the Soviet system all students in the equivalent of the US high schools get all of these subjects: algebra, geometry, mathematics, physics, and chemistry, and no less than twenty percent of their entire time in school has been spent in studying mathematics.

The question is obvious: there is something wrong with our system—what is it? Science is playing the glamor role of the age. The high school group is an impressionable group, yet it seems to shy away from the most provocative areas, especially from physics. Well, you can have a subtle answer if you like, but mine is very simple. Math and physics are hard, and youth, as some of us may recall, is lazy. And if it is a combination of the carrot and the stick to overcome this obstacle, for the time being at least, we have lost a little of the secret. We must rediscover it.

What then about the quality of the teaching at the high school level which certainly bears on the attitude of the students in these difficult subjects? We define quality as availability in numbers of teachers, their individual qualifications for teaching, and the effectiveness with which their services are employed.

That quality perhaps can be summed up in its present trend at least, by three rather simple statistics. As to the total number of these teachers, some 11,000 qualified mathematics and science teachers are needed annually to go into the high school systems. Some 8,000 are appearing. No present efforts to correct this numbers situation have very much more than scratched the surface if you look at this on-coming flood.

As for individual teacher abilities, you may wish to note that in more than a third of our states in the country no science or mathematics is listed as a prerequisite for a certificate for teaching. Last year, more than a third of the posts in high school mathematics were filled by teachers trained in other disciplines. I could remark on this point also that the formal qualifications for teaching these technical subjects might well give more importance to understanding and knowledge of the subject matter, and place less importance on how many college courses were taken in the techniques of teaching; and the professional scientific and engineering societies, to which many of you belong, can certainly help a lot in pushing home this point.

As for the effectiveness of teacher employment, only half the approximately 70,000 persons teaching science in our secondary schools do so full time; the others teach at least one class in some other subject, and even those teaching science full time teach during the day several different sciences to suit varying abilities and often to widely varying maturities.

Attracting an adequate number of good people is, of course, a basic requirement with which none of us would argue. If you would like a well known contrast again, in the Soviet Union the teaching profession is surrounded with great prestige, and a specific number of science and mathematics teachers are trained annually and assigned to teach those subjects at the secondary school level. Under our school system, of course, there are no assignments or allocations. We have to develop, or more properly phrased, we must recreate the attractions that will get the necessary number of people into this critical profession.

Still on the subject of high school science, the physical equipment, as you well know, is in many places inadequate, to put it modestly, and the training aids and their concept are terribly rudimentary in contrast with the sophistication, when you come into this business, in the military services and in the industries of the country. The design of effective teaching aids is a pretty sophisticated problem. The equipment problem is relatively easy to solve: you buy more and you buy better; but training aids, that's another matter. But at least one bright idea has emerged recently which has the objective of bringing to bear at the high school level the personalities and the inspiration of the great teachers of science. It is proposed to do this through a series of movie shorts, highly professional, in which these great men appear. Each movie would be accompanied by a small piece of literature to assist the high school teacher in picking up the subject where the great man leaves off. You will no doubt see and hear considerably more of this idea. My point would be this: It should be only the first of many.

So much for the high school level. We might look at the limited number of pieces of the problem at the collegiate and university levels.

Since 1900, enrollment in higher education has increased five times as

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JAMES McCORMACK, JR.

General McCormack became Special Advisor to the President of MIT when he retired as AF Director of Research and Development in 1955. Born in Chatham, La., in 1910, he's a West Point graduate ('32), with degrees from Oxford ('35) and MIT ('37).

fast as the population in the country, but the more significant fact is that the country's productivity has increased right along with the rate of enrollment in higher education. Yet even now, two-thirds of the top fifty percent of our high school graduates in this country do not continue on to receive a college degree. This is a matter of outstanding importance in any efforts to increase the supply of competent scientists and engineers.

Of perhaps even more significance, in a particular sense, is the fact that one-third of the top two percent of high school graduates fail, for one reason or another, to go on and receive a university degree. These are the kids who have demonstrated, the best that one can do in adolescence anyway, a special talent for academic learning. A talent that is indeed critical in these times when those who work on the frontiers of science must spend long, hard years just in learning where the frontiers lie and what they are like.

Here are 10,000 a year who are lost from this group of the absolute top of the high school graduates. The question, of course, is how to attract a larger number of these people of unusual academic aptitudes. There is a long road of learning and how are we to attract them while they are still in their formative years? There are some answers. Of course, there should be continuing attention to make sure there are no gaps in the financial aid that is available to these people. But the real and much tougher answer lies, in my opinion, in the matter of the prestige of learning. Great scholars develop in an atmosphere where scholarship is genuinely and meaningfully renowned.

To depart from the area of spectacular minds, let us look for a moment at the other end of the collegiate spectrum where the problems are somewhat different but no less important for that reason. There are many national shortages in the semi-professional fields, for example: research assistants, engineering aides, draftsmen, agricultural and irrigation specialists, dental hygienists, and forest rangers. These are the people who are important for two big reasons. The first is, they multiply the product of higher skilled professionals and, secondly, they relieve the higher skilled professionals to go on to advanced work. This is the area in which the junior, or two-year, college plays a very important role, affording, as it does, at minimum cost of time and money an opportunity for high school graduates to attain the level of education and initial training which the next twenty years will demand in a very large amount.

In California, for example, where this system is working very well, three-quarters of those in their last two years at the state universities come from the junior colleges.

To close out these remarks, I will return to one most important aspect of the problem of attracting the sharply rising, necessary number of good teachers to the various levels of the educational structure. Joe E. Lewis has amused many of us many times, I am sure, with the remark that money ain't everything but you can certainly buy a lot of things with it. It buys necessities, it buys conveniences, it buys security for individuals and for their families. But, on a slightly different point, in the American way of life, it is one of the facets, anyway, the ability to buy not only the necessities but some of these luxuries, which becomes a hallmark of community standing and respect.

Particularly in the long term, a profession, as we all well know, must promise some of the good things of our material civilization if it is to attract a reasonable proportion of the better qualified amongst our youth. The significance of this, related to the profession of education, is clearly apparent when you also take into account that a shortage of good teachers has the unique potency of multiplying all other shortages in the development of succeeding generations.

What the academic salary schedule should be is not a matter that you can settle here this morning, but let me end by giving you one little statistic that may help you form your own impression.

To restore our teachers in our high schools and universities to the relative economic position they occupied in this country at the turn of the century fifty years ago—just to restore them—would require an average increase of more than seventy percent in salaries in these categories, high school and university teachers. Other teaching categories are somewhat better off, and some are worse off. Just as in the case of the military services, the people at the top of the ladder are the worst off of all. It would take an increase of something like 165 percent to restore the high school principal to his position fifty years ago.

The problem was well summed up by Beardsley Ruml in quoting an industrialist talking about an educator's salary. This industrialist, who sounds like a very practical man, made the following statement: "When a teacher's income gets up to the point where you will seriously suggest to your boy that he give consideration to teaching as a profession, then we may be approaching the right figure."

But to end on a hopeful note, which Dr. Waterman has established, we are surely on our way out of our present difficulties when so many people in the country are now enough concerned about it to roll up their sleeves and go to work. Especially appropriate is this occasion. It is a wonderfully encouraging fact that the Air Force Association should spend such a great amount of its time this year on this particular subject.

After General McCormack's remarks, the third member of the Symposium Panel—Dr. Alexander G. Korol of MIT's Center for International Studies—described how the Russian educational system operates.—The Editors.

Dr. Korol: Having examined many aspects of education in the Soviet Union, I feel that in any one particular part of it, any one variable in that complex relationship, which gives quality to education, one finds many recognized faults.

It is significant, for instance, that since 1954, following party preferences, rather drastic changes have been made at a rapid rate, some of which indicate a total departure from previous practice. So, generally speaking, I would start by saying that in spite of the extremely impressive record of tangible and specific accomplishments in various areas, their educational system is far from perfect, if you can see their total social requirements and the well-being of the nation as a whole. If one takes power potential, economical and military, into the picture, as we have seen, it is totally different.

Mr. DeWitt pointed out four major elements of policy, and now to amplify one or two of them, merely to indicate how much larger the program or the problem of the United States is. It is obvious from what we have heard that the Soviet government—in this case specifically the party leadership, insofar as the major decisions are concerned—is able to allocate not only material resources but human resources as well. In our case, we want to have our cake and eat it too. We talk of shortages of all kinds of technical skills, but at the same time, we would like to continue to produce Continental Mark

IIs at $10,000 a throw. So we want to have everything, and I hope we will continue to do so.

Consequently, in many ways the history of the policies of the educational system in the Soviet Union is a lesson. The proof of the pudding can currently be seen in their own desire to change the system of the very narrow, vertically integrated engineering training.

A flashback in history might be in order. In the 1930s, when industrialization was decided upon as national policy, the efforts were mobilized in certain key areas. To support these efforts, whatever the area, the authority in charge had to develop the entire range of facilities, including training. So, for many years, various engineering schools there, in fact, belonged to one industry. Nonferrous metals or machine building had a series of schools at different levels geared down to training on the job.

That system has been greatly modified since 1946, but the traditions are still there. And in the long run, toward the objectives that are now expressed in terms of the immediate needs, the system is admittedly a failure. Today, they are trying and advocating a million changes to revamp their engineering training and more or less following the philosophy that has crystallized itself in America and is practiced very vigorously in schools where you see engineering training at its best. And that is emphasis on science, on theory, broad preparation, preparation for future development, preparation for future specialized competence in whatever area an engineer may have to meet, instead of the school itself training for the job on hand. And that is how the engineering colleges and institutes in Russia were organized in the 1930s and continue to operate today, but, of course, there are many changes and if some of them are carried out, unquestionably the quality across the board will be enhanced.

Because of our limited time, I will say very little about our advanced training and perhaps leave it at this generalization. Qualitatively the difference disappears as you go up the academic scale, and I am now comparing America with the Soviet Union. When you come to the postgraduate work in research or graduate training in selected areas, the very best year is not very far ahead and certainly is not behind in the Soviet Union. However, the difference in increase, unfortunately—academically speaking—is in favor of the Soviet Union as you go down the scale, and is particularly strong at the level of the secondary schools. Some of the important points have already been mentioned about the percentage of students taking science and mathematics. It is, of course, a big question whether every youngster must necessarily have physics or chemistry or even math to the limit they do.

The secondary schools of the Soviet Union automatically go through trigonometry and solid geometry, of course. However, undeniably, the thing is that every youngster is, at least in theory, exposed to the challenge presented by scientific methods in mathematics. An examination of the available material would indicate that in spite of great difficulties deriving from the central and pro-military control over a period of years in techniques of teaching, the programs have been developed rather well.

For instance, at quite an early age, even in the teaching of arithmetic, the concept of notes is introduced and the transition to algebra becomes that much easier. The concepts of derivatives and calculus are introduced with algebra, and so on. Now, there are many difficulties and I don't say necessarily that one hundred percent of all youngsters must necessarily struggle through physics or trigonometry, but the fact is that you create, more or less, a total automatic selection and exposure to the challenge of that science and math.

The two countries, the United States and the Soviet Union, are the only two that have mass education. In the Soviet case, what has happened historically is that they took traditional European models of higher secondary education for the élite, and primarily as a college preparatory school, and it has functioned that way for many years. Then they multiplied it by mass obligation, as you have seen from the figures. Of course, they developed all kinds of difficulties some of which, in the United States, have gradually been solved over the period of the last forty years while others still demand solution; that is, how to combine mass education with top-level quality. So, they have their own problems, too. Every problem mentioned by General McCormack can be amplified in many ways for the Soviet states, and some of them are much more difficult for them to solve than for us.

But the difference is this: that there it depends on the state, on the central control entirely, whereas here, we must develop local action that goes down to the individual, not only to the schools but the individual communities and to the parents.

For instance, over there it is a consistent policy of emphasis on science and engineering, on industrial achievement, and through this they have created a hydraulic head against the dam of quality in education. The role of the secondary school is to build up the pressure against the control of education at higher levels. Then, if you would continue the simile, the civil authorities manipulate the gate just the way they see fit; they are automatically manipulated in order to meet the needs of the state. One gate is opened wider and the other is closed completely, but the pressure is there because it is quite obvious that the prestige of education, the prestige of learning, for a variety of reasons, has been very, very high.

One reason is that there are no alternatives. No youngster in school can say, "This is too tough—I am going back with my dad and sell automobiles. He himself went through high school and he is the richest man in town." No such alternatives are available in the Soviet Union. Furthermore, in America, with its smaller population, our college enrollment is very much larger than in the Soviet Union, but we must remember that a hundred percent of their enrollment is for professional training. The concept of the liberal college does not exist and is not in the picture.

Now, let me say a few things about the difficulties. They all stem from the central control. The central control not only decides how many people, as Mr. DeWitt says—those are actual facts—are to be accepted but the central control agency for higher education also decides on detail, varied details of curricula. It prescribes all the hours, distribution, recreation time, and all that. Sometimes the difficulties, of course, arise across the board; sometimes it is regarding the capability of an individual school. In many cases, there are scandalous difficulties developed, such as MIT being instructed all of a sudden to teach ballet dancing, to make an exaggeration.

One of the weaknesses of higher education is the method of teaching. Students are completely overloaded with scheduled work. In comparison, and this is the only bit of statistics I will read, roughly speaking, what corresponds to high school in the So-

(Continued on following page)

viet Union is a ten-year school, ten years instead of twelve. There is no question that the best, the most talented students, cover in ten years far more hours than the average American high school graduate. In some areas, there is no question about that. So they have a two-year start, not a two-year start, since we start a year earlier, but a one-year start in that respect. That surely applies to mathematics and surely applies to science.

The number of years in the colleges in the USSR is five years; in the United States, four years in the normal, undergraduate instruction. Next, within the academic year, in terms of weeks, 170 weeks are assigned for class attendance in the Soviet schools and thirty-five weeks for oral examination; 170 plus thirty-five for a total of 205 weeks spent in residence as against the average US residence time of 120 weeks in classes, laboratories, and seminars plus twelve weeks of examinations for a total of 132. A total of 132 as against 205; that is one point.

On the negative side, however, I believe, is the fact that a Soviet student spends thirty-six hours of allocated scheduled time as against twenty-four hours in American schools. The comparison becomes even more striking when you see the entire year. For the Soviet student, it is 1,224 scheduled hours of compulsory attendance as against 720 hours in the American school. Now, I say that is a negative factor but the total exposure time, of course, is not; they spend five years and you spend four.

The most important development on the Soviet scene today is that they are trying to produce or to broaden the scope of their engineers, the specialization of their engineers, because there were at one time as many as eighty-seven specialties in just machine design and machine building, eighty-seven different specialties. But we must remember that because of longer time, their specialization comes on top of a pretty thorough preparation.

As a closing remark, I would say this: that whereas engineering training and enginering schools were perfectly integrated with the youth for specific needs, that is not so with reference to science training in the universities and partly in polytechnic institutes and so forth. But there are thirteen universities with some 1,020 students enrolled; they are trained in science *per se* and the early schools do not train in science. Science is purely a service course, whereas that is not true in American schools.

Question: I would like to ask Mr. DeWitt if he feels that in the areas of population, resources, and land, and possibly the area of technology, the USSR is a potentially stronger power than the US?

Mr. DeWitt: My answer is a very simple one: I don't think so.

Mr. Stewart: I should like to ask how are Soviet students placed in jobs after graduation?

Mr. Korol: They are assigned by a special ministry. As I said, the students are under the charge of one ministry or another, so by an elaborate process, they are assigned some months before graduation and they will be distributed. The Soviet student, graduate student, has no other opportunity. In practice, of course, it is not quite as hard as it sounds, but with some exceptions the best students usually get the best assignments. But, formally, they are, of course, obligated to serve at their appointed posts for three years.—END

Labor's View of the Manpower Needs of Industry

By A. J. Hayes PRESIDENT, INTERNATIONAL ASSOCIATION OF MACHINISTS (AFL-CIO)

WE IN organized labor believe that the future of the aircraft industry is a vital concern to every thinking American. And I said thinking American. In its contribution to our over-all national economy, the industry stands second only to the automobile industry. In addition, it provides our nation with its first line of defense in the event of war. It has provided, and I think can continue to provide, our country with leadership in the growingly important field of civil aircraft.

And for me I assure you, it's a pleasure to be with you today to discuss some of the problems facing this important segment of our economy and our national defense.

From the viewpoint of the organized labor movement I think the topic for today's session is a very important one, and I will say to you that it is controversial. Particularly I think you will agree with me after I finish speaking. Your President, Mr. Wilson, requested that I give you my opinions regarding some of the specific problems connected with manpower in the aircraft industry. And as I give you "my" opinion, I'm also giving you the opinion of many in the organized labor movement, and I intend to devote myself to those problems and to do so as concisely as possible in view of the limited amount of time available to each participant in this Symposium.

I do sincerely hope that we can all discuss this matter in a frank manner and in specific terms rather than in vague generalities, which is probably the most polite way. I hold and express this hope because I believe that the present status of the world requires a prompt and specific solution to any and all problems existing in this very important industry. I don't think that we can solve the problems on the basis of vague generalities. I think that this industry may well decide the outcome of the present cold war, and I believe that one day it may be called upon to decide the outcome of a hot war, perhaps of global proportions if and when such a war is forced upon us. No one, of course, knows definitely what factors, or combinations of factors, are re-

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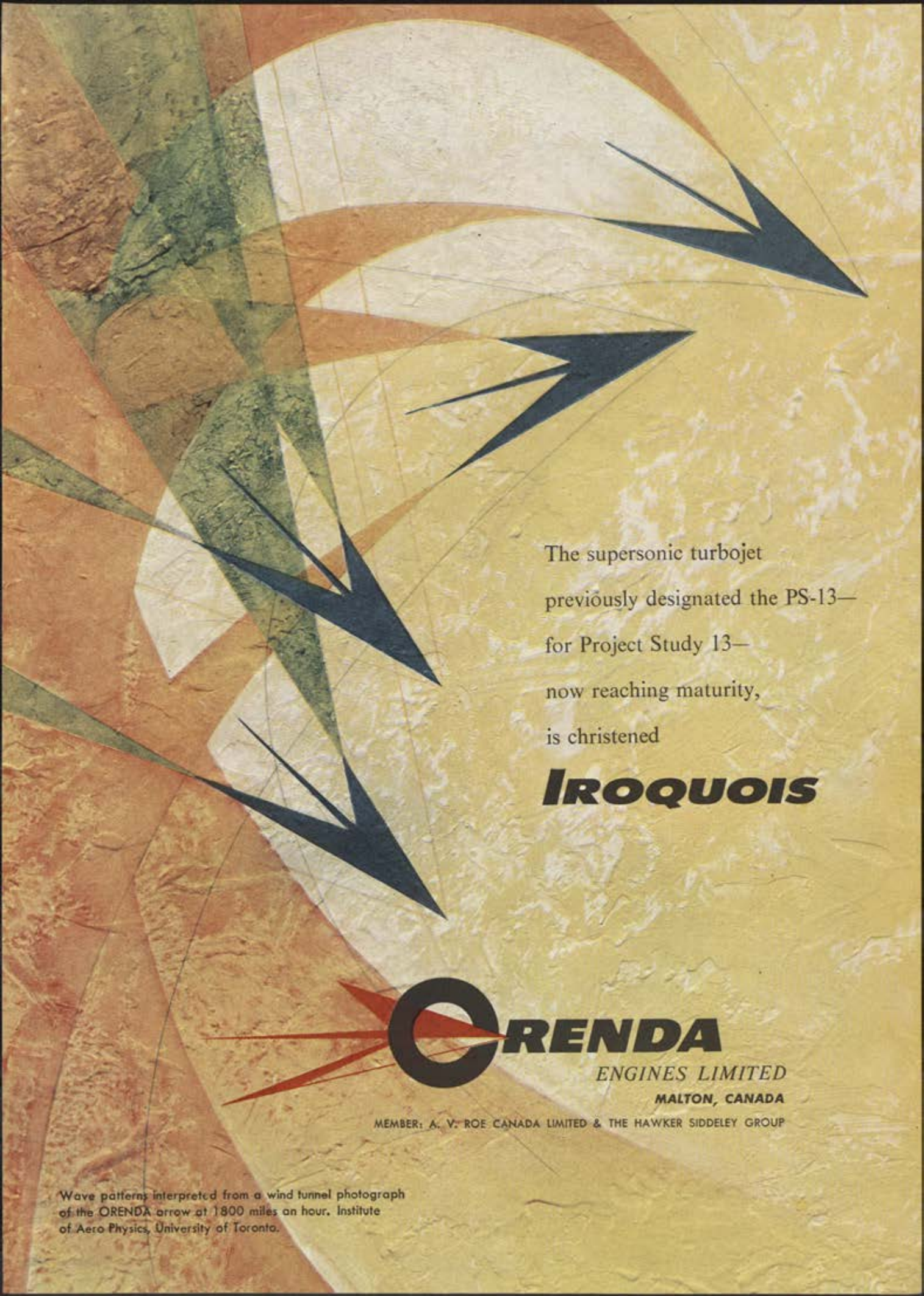
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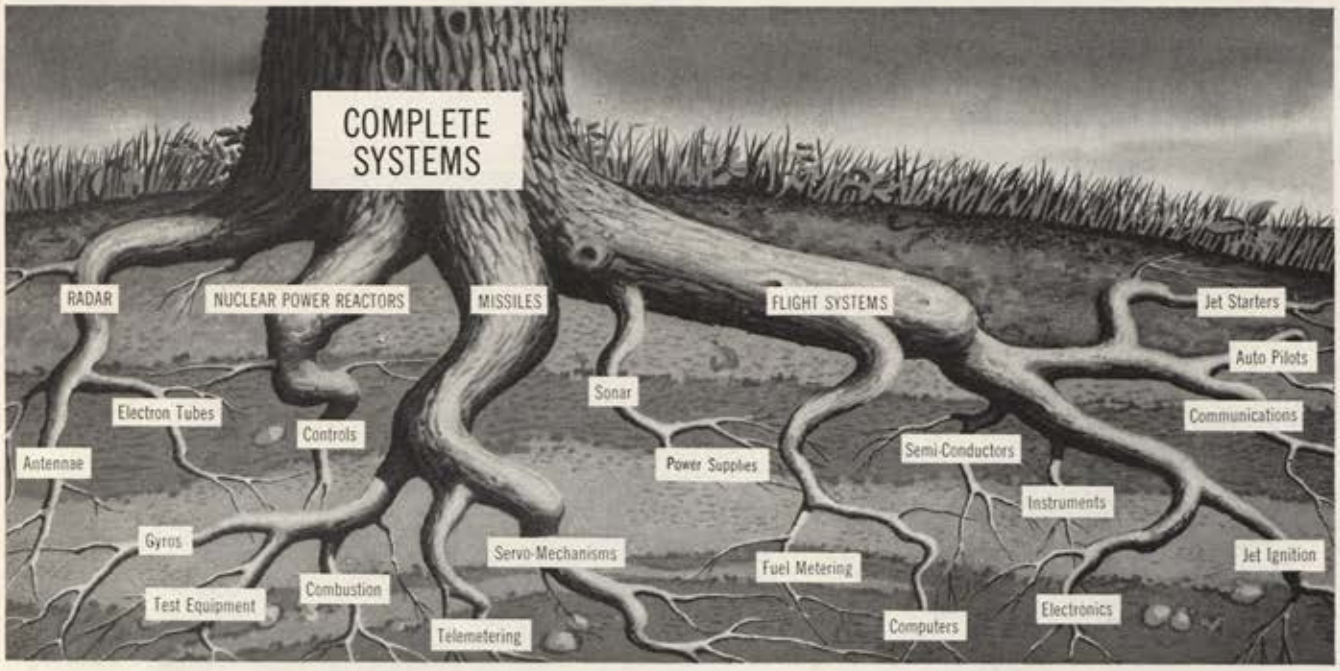

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sponsible for prolonging the so-called cold war or which prevent the cold war from becoming a hot war. Notwithstanding this fact, however, we have every good reason to believe that the technical and the scientific superiority of the Free World—especially that of the US and Canada—and secondly the quality and the potential of our people, are the two most important advantages which we presently hold over the communistic countries of the world.

In military potential I suppose that superiority is expressed most importantly in nuclear and thermonuclear weapons and our ability to deliver these weapons promptly, precisely, and, incidentally, plentifully over vast distances. Take away that superiority, take it away tomorrow, and the safety catch is off the gun which may well touch off the next world war. If we are to give credence to recent reports—and incidentally I do—the gap between the Free World and the Soviet bloc—the gap which is now our margin of safety, if you please—is narrowing and is narrowing very dangerously.

This fact, I believe, emphasizes and influences any discussion of problems stemming from or relating to the aircraft industry. Three weeks ago last Wednesday, I addressed another conference organized in the aircraft industry. It was the Aircraft and Guided Missile Conference of our own organization, our own Union, and I prefaced my remarks to our own people with these words:

"Our, meaning our Union, interest in and concern about the aircraft industry is not, or at least should not be, a selfish one. We are not concerned only because our members are employed in the industry. What happens in this industry should be the concern of every sincere citizen of our countries who has any knowledge at all about the world situation.

"In today's Canada and US, our aircraft and guided missile industry in all probability holds the key to our future lives. Therefore, what we—and what others—do in this industry and with this industry is of major importance to us and to the rest of the world."

I approach my assignment here today in the same spirit.

It may well be that at times my remarks will seem blunt, and perhaps overly critical, of certain practices and viewpoints. If that happens, I sincerely hope that you do not blame it on bad manners; rather blame it on the fact that the time allotted to me is limited, and that our time to do something in the aircraft industry may be just as limited.

Basically, I believe the manpower problem—and I am speaking of the over-all manpower problem, not only the problem insofar as scientific manpower and engines are concerned, but the over-all problem—basically that problem in the aircraft industry and perhaps in any other industry is influenced by two main factors: First, the over-all manpower supply in the country and, second, the ability of this particular industry to compete with other industries in attracting the needed number of workers from that supply.

Of course, today our general manpower supply is generally considered to be ample, but nevertheless there are still critical shortages in the important fields of scientific and technical personnel, and our supply of versatile skilled craftsmen is not nearly as large as it should be. From what we read, our population experts tell us that we are facing a general manpower shortage in the next twenty years, as a result of the low birth rates of the 1930s. If this is true, and I believe it is, this means that we shall have to meet a mounting demand for both civilian and defense goods with a proportionately smaller labor force. There is only one way in which that can be done—and that is by raising the general level of productivity and the general quality of our work forces.

Quality of manpower, it has long seemed to me, is a product of two important factors, not one. Quality of manpower is not decided by education alone in my judgment. I believe that the two important factors involved are education and health. And any realistic program to improve the general quality of our work force must include:

- An expansion of our existing programs of health insurance, and a trend away from the prevalent concept of indemnity payments for the costs of illness toward the more enlightened concept of comprehensive medical services geared to the maintenance of good health, and early diagnosis and treatment to prevent serious illness.
- A program of increased, and I'm not afraid to say it, increased federal participation in financing our system of public education, so that we may overcome the present deficits in school plant and personnel which deny to so many of our children access to the type of education which will enable them to develop their talents and their abilities to the very highest degree.
- Thirdly, a concerted consideration of the current situation at higher levels of education to the end that more of our qualified children may go on to colleges and universities.

I realize that we have made some progress in the fields of health and public education, but we still have far to go. Today, thanks largely to the insistence of labor unions, and I hope I am not being modest, a large and growing number of our industrial workers and their dependents are covered by some sort of health and welfare plans—more than ever before. The information essential to further progress exists in such documents as the report of the President's Commission on the Health Needs of the Nation, and the more recent studies of other groups.

In the field of public education, the attention of our people has been aroused and intensified by the work of the National Citizens Commission for Public Schools and its successor organization, the National Citizens Council for Better Schools, and the recent White House Conference on Education.

As one who has been privileged to participate in the work of such groups, and in fact all three, in studying our health and educational problems, I can testify that these groups did make a great contribution to the compilation of facts and statistics. And I can attest, too, to the fact that we still have a long way to go in both fields in utilizing these facts and statistics to the best interest of our country. We do have the knowledge of the problems concerned. We have the information essential to further progress. The time, I believe, for further inquiry has just about passed, and the time for action has arrived. In fact, it arrived a long time ago. I think it is up to us—the American people—to cast aside some of the traditions and prejudices which are keeping us from taking effective steps in these fields before they wind up by weakening us to the point of defeat in our contest with imperialistic Communism.

The situation facing our colleges and universities, I believe, is serious, more serious probably than some of the heads of the colleges and universities might want to admit. The shortage of scientists and engineers threatens to be a very major impediment to our future technological progress. The subject, as you may know, as you have already been told this

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morning, is now under study by the President's Committee on Education Beyond High School. If we are to raise the general quality of our manpower, which I believe we must do, I don't believe that we have any choice in the matter. It seems to me that we must give a high priority to the health and the education of all of the American people or at least to the health and education opportunities of the American people. In my judgment, there is no alternative.

Granted the development of a high-quality work force, then the specific problem of the aircraft industry is that of attracting and not only attracting, but attracting and holding the manpower it needs, and of using this manpower with the greatest possible efficiency.

Now the factors which enable an industry, or a plant within an industry, to accomplish these things, of course, are many and varied, but basically, I think, they may be classified under these three major groupings: (1) and this to those of you on the industry side, stability of employment—that is very important, (2) general management-employee relations, and (3) opportunity to advance, both financially and within a given trade or profession.

With regard to number one, stability of employment, I believe, is the first consideration, and the other two factors must rest upon its successful solution. There can be no sound basis of labor-management relations, or no continuing and sure opportunity to advance if continued employment itself is uncertain, and certainly it has been uncertain in the past.

So long as the industry depends so heavily upon government contracts, our national defense policy and federal procurement practices will be factors of paramount importance. While it is true that employment for the industry as a whole has somewhat stabilized over the past few years, there still continues to be sudden and marked fluctuations of employment in many individual aircraft plants. In fact, lay-off 5,000, 6,000, and 7,000 at one time. This situation must be remedied if the industry is to have the stability essential to building the continuing manpower it needs to fill its role in our defense and in our civilian economy. To the extent that the situation, and I am talking about the unstable situation, stems from federal procurement policies, the Defense Department must take this into consideration. To the extent that it is the consequence of management practices, aircraft management must make the necessary adjustments.

Another disturbing factor in recent years, this may be controversial also, has been what seems to be a calculated policy of leaving certain phases of research and development workmen to the aircraft industry of other countries, and I'm not speaking now of the time when this was necessary during the war. I am speaking about the period between wars and following the wars. This has been most marked in the field of development of turboprop and jet engines. It also exists in some other fields. Let me preface what I am about to say with this statement, lest there be a misunderstanding.

Certainly, we in the United States, want to see our allies in freedom develop their own basic defense and other industries to the greatest possible extent, and I think perhaps we want to assist them too. But not, it seems to me, at the expense of our own research and productive capacities. We just have no guarantee that the aircraft and guided missile industry in other countries could continue to operate for long in the event of a sudden attack. And in some countries, I think it must be admitted, that political and social circumstances are such that we have no guarantee at all that allegiances may not be transferred from the Free World to the Soviet bloc. We, as well as our allies, I believe, must be strong in every major field of our defense, and I believe that research and development is one of the most important.

Basically, we of the Machinists' Union, propose that, in order to develop an adequate work force, stability of employment be developed and maintained through the following specific activities:

- And this, I believe, is important. By a program of national airpower predicated upon the continuing threat of Communism to our way of life instead of upon the ebbs and flows of the cold war.
- Secondly, by a research and development program which covers every phase of military and civil aircraft.
- Thirdly, by what I would refer to as an industry plan, developed jointly by labor, management, and, perhaps, government to maintain a stable work force, including the possibility of offsetting temporary fluctuations in manpower needs by a fluctuating schedule of hours, rather than periodic layoffs.

If we—as a nation, as an industry, and as management and labor within the industry—accomplish these objectives, the industry will be in a better position to compete for its necessary share of the pool of national manpower.

In the field of labor-management relations, the over-all situation is fairly good, but there is still much room for improvement, as perhaps always will be. Basically, we believe that a greater trend toward industry-wide uniformity of wages, conditions, and other benefits is desirable and is necessary.

In the field of manpower utilization and providing opportunities for advancement, especially in the skilled trades, the aircraft industry has a long way to go.

The Federal Bureau of Apprenticeship has just completed a survey of apprenticeship and training in the industry. The survey covered 143 plants employing about ninety percent of the industry's current employment.

Only forty-four of the 143 plants surveyed had operating apprenticeship programs. These plants employed 262,000 workers, less than one-half of the employment in the plants surveyed. With more than 20,000 journeymen in various crafts on their payrolls, these forty-four plants were training only 1,376 apprentices. That is less than one apprentice for every fifteen journeymen—a ratio far too high to take care of even replacement needs, let alone to provide a base for the increased number of craftsmen which we believe technological development will demand. And remember, this is the situation in that minority segment of the industy which pays any attention at all to apprentice training. The remaining ninety-nine plants, employing more than one-half the workers, have no apprenticeship programs at all.

The same survey revealed a somewhat brighter picture in short-term training with 116 of the 143 plants reporting some kind of short-term training program. Further analysis showed that about ten percent of the employees in these plants were enrolled in such programs.

Frankly, I think the problem of fitting manpower within the industry

(Continued on page 74)

A. J. HAYES

Mr. Hayes, President of the International Association of Machinists, AFL-CIO, was born in Milwaukee and first joined IAM there in 1919. He became General Vice President in 1944 and President in 1949. He's served the Pentagon on manpower matters.

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for more skilled and higher grade work is one which justifies a special study of the present and the future manpower needs of the industry, with special reference to craftsmen and the more highly skilled production workers as well as to scientific and technical personnel.

Such a study might become part of the broad program of an air policy commission like the one President James Killian of MIT suggested earlier this year—perhaps a successor to the Finletter Commission.

I do not believe that the aircraft industry can continue on a haphazard approach to the problem of training its own manpower. It is time we discovered the details of the existing situation, studied possible future needs, and took definite action to plug present deficiencies and meet new needs.

As an integral part of the American economy it seems to me that it is up to us—each one of us—to help in solving the broad problem of developing the over-all reservoir of quality manpower upon which a nation, certainly in this type of world, must depend. After we have accomplished that, let us—all of us involved in and concerned with the aircraft industry—get down to the problem of building, maintaining, and utilizing the manpower essential to adequate air defense and a healthy continuing aircraft industry.—END

How Management Looks at the Manpower Problem

By Floyd B. Odlum PRESIDENT, ATLAS CORPORATION

I HAVE been keenly interested from the beginning in airpower in general, and the Air Force in particular. I had also been rather active, particularly in the early days, in the Air Force Association when it was going through its early growing pains. And today, I am impressed, terribly impressed, with what progress has been made. What we are seeing here in New Orleans is a great tribute to these people who are energetically trying to further and protect our airpower. I think the Air Force Association is fast becoming one of our most powerful influences in airpower defense in America.

I am highly honored to be asked to speak today on this subject at hand, and I speak from the standpoint of industry relating particularly to the shortage of manpower in the sciences and in engineering.

I came into business as a youngster concurrently with the income tax. That means that I have been at work for something over forty years. During those forty years, I have had the unusual experience of being in and out of various businesses in various industries. The differences between those industries are, of course, glaringly apparent. I have never tried during those years to find out how to direct Jimmy Stewart on the set or how to make and sink a rivet, but there is something common to all those businesses and industries. There is an "X" factor, and it is that "X" common factor that has a great deal to do with our problems of today, and with the progress that we will make. Perhaps with that experience, I see the forest more than I see the individual trees, and it is from that standpoint that I will make my brief remarks.

Man has made fairly continuous progress for himself ever since discovering and applying use of fire and the wheel. But there have been long lulls and fast jumps. The industrial revolution started in one of those fast jumps forward. This industrial revolution started in England, not too long before the Wright Brothers made the first powered airplane flight. It spread to Europe and to America. It then caught on to a lesser degree in India, in some of the Far Eastern countries, particularly Japan, until Japan felt strong enough to challenge our supremacy. The German leaders acknowledged after both World Wars that they were defeated by our American industrial capacity.

And now, the industrial revolution has taken hold in Russia. It had its beginnings there during or shortly after World War I. The industrial growth in Russia has been very rapid in recent years. Russia started in this respect, let it be remembered, with our own machines, equipment, and know-how. Let it also be remembered that we have a national policy of aiding, through our Point Four program and otherwise, so-called backward nations on their way to industrial self-sufficiency.

Man's desires for more things, for a higher standard of living, seem insatiable. The raw materials for these are mostly dug up from the earth—the oils, the metals, and so forth. First, we had to dig only lightly to get rich grades of metal for fabrication, and then oil for heat. But as we have gone on and on, and getting more goods per capita, we have had to mine deeper; we have had to do more refining. And these extra efforts and these extra costs must be offset by improved technology.

In this process, brawn has given away to brain power. Foot power has given way to horsepower, and horsepower has given way to megawatts.

Study all the nations today, and you will find that their industrial progress and standard of living tie directly into the amount of mechanical energy used per capita. The abundance and cheapness of electrical and other forms of mechanical energy are what counts. High wages do not hold us back if backed up by cheaply operated machines and mass production. For that reason, I do not go along with the fears of some that Russia will take world trade away from us because her laborer gets only about one-sixth the wage we pay in the United States.

We use six times the energy per capita that is used per capita in Russia. At the turn of the century each

man, woman, and child in America had less than one-half horsepower of mechanical energy at his disposal. Today, we have nearly 100 times as much energy per capita available as slave labor. One horsepower is what it takes to raise a weight of 33,000 pounds one foot in one minute. Today, we have six billion horsepower available in the United States. Imagine every person in this country running around with sufficient power in his hands to raise 700 tons a foot off the ground every minute. Well, that's what we have today in the United States.

If cheap and abundant mechanical energy is the thing, and it is, then we are entering a new era which is being superimposed on the industrial age. It is the atomic era. The fissioning of the uranium atom has brought us an abundant source of heat that will keep our presently cheap energy costs from rising in future years. It is scientific, a technological advance with outstanding impact. But there is a reverse side to the coin. Atomic energy will also be abundant and cheap all around the world in places where coal and oil are now too expensive in energy value to transport and use. The hand-maidens of atomic energy, that is, jet propulsion, electronics, and automatic controls, are also in the case of principals in this show of tomorrow's life—yes, and weather modification too. I forecast that as a result of these brain children to the present centers of industrial power and leadership, the present places of high standards of living have no monopoly. We will lose our place of prominence unless we take heed and do the necessary things.

The threat to our leadership is great.

There is no point in expecting Russia to slow up her industrialization or, for that matter, any other country. Our job is to keep ahead of the others. What I have to say on this point adds up to more and better use of scientists and engineers. The Free World is in contest with Communism on the economic front even as it is on the military front. This contest is breaking out openly right now. The size and quality of the technical and scientific elements on either side will form a very real and major element in any final decision in the struggle between Communism and our own way of life.

Today, we are moving into the age of automatic controls with more output and fewer man hours. Intelligent direction of the controls, therefore, becomes all important; pure basic science must be the fountainhead for all this. Applied science and technology must follow through in top, all-important posts. The countries that during the next few years develop the greatest scientists and engineers, the most and the best, are the countries that will be the foremost, the most powerful and the most prosperous in this new jet-atomic age.

In this regard, it is now generally recognized, as this very Symposium implies, that the United States is in real danger of falling behind the Soviet Union in the critical fields of education, training, and the use of adequate numbers of scientists, engineers, and technicians.

The Russians noticed some years back where we were strong and they were weak. They have started to copy our elements of strength and with a vengeance.

You have heard statistics today from other qualified speakers, and I will not repeat. Let us not engage in the wishful thinking that the quality of the Russian scientists and engineers is inferior to our own. We have been engaging in this question of numbers and quality in the aircraft field, I think, to our detriment. During the last few years, we have given way on the matter of quantity in the belief and the assertions that we were well ahead in the matter of quality. We may now be waking up to the fact that the gap has also closed, or is close to closing, in the matter of quality as well.

I believe it was General Arnold who said that a second-Best Air Force is like a second hand in a poker game—it doesn't rate very high. It's true that in Russia they have not improved their plumbing; they haven't paved their streets, but let us not be deluded by that. It may be that what they are doing is giving attention to first things first and meeting their long-range objectives which are illimitable in their interests and dangerous to our United States and our people.

Now, what can we do, particularly from industry's standpoint, to improve our situation? Long-range solutions would involve the following:

First, better, more intensive teaching of the sciences in our colleges and universities to more students. This involves getting more freshmen into our advanced schools of learning with the preliminary training to qualify them to major in the sciences. This, in turn, involves teachers in our primary and secondary schools better qualified to train the youngsters in mathematics, physics, chemistry, and the like. Many of the high school teachers are now just one jump ahead of their pupils in these science subjects.

Finally and most important of all, the children must be intrigued into studying the subjects.

Industry can do its share here by supporting the education of teachers through scholarships and grants. Also through the loans of its own personnel as teachers. Also by minimizing the plundering of colleges and universities of their teaching staffs and talent in these critical fields. Instead of hiring top scientists away from their teaching of others, industry might better leave them where they are and hire them as part-time consultants.

When one industrial unit hires scientists away from another industrial unit, our over-all national problem is not helped. I have seen a lot of this go on. I have seen it go on more than once in the same organization, and, I am sure that it has been disruptive. It can only be hoped, on the other hand, that it may have had its constructive features.

Individuals in industry can also well afford to devote their personal attention to the fiscal and management problems of the secondary schools in the communities in which they live. For us who believe in states rights, including the field of education, let's not let neglect of teaching become a serious matter of national defense.

Industry might use its renowned imagination and sales technique through advertising, and otherwise, to impress young Americans, boys and girls—and here let me say that in Russia, I understand, that twenty percent of the graduating scientists are girls—that science when properly taught and understood is interesting and exciting. Here I also believe our scientific friends could help by bringing their imaginations to bear on how we can make algebra and geometry fun for our youngsters.

I recently saw a television lecture by Dr. Edward Teller on nuclear energy. It was entertainment of the highest order and instructive. We need more things like this presented to our youth during their impressionable formative years.

I see plenty of juvenile cowboys and Davy Crocketts running around the streets. There is no future connected with the long rifle or the branding iron. There is an atomic establishment down in the area Davy Crockett trod, and the cowboy ranges

(Continued on following page)

of the west are providing us with uranium. The future fun for these boys and girls will be in converting these parts of the earth's surface into heat and light and medicine and better goods as well as into new flying machines guided by remote control. They should be made to realize that there is plenty of excitement, plenty of fire to intrigue the imagination on the inside of an atom.

And I must not neglect to state that there should be scholarships in abundance for well qualified students in science as well as teaching grants. Industry and foundations should do this directly with worthy trainees, or through the schools see that this comes about.

And I would suggest various means of getting more mileage from the scientific and engineering talent that we already have with us in industry. This means better management.

At this point, I wish to remark that about a third of the scientists and engineers in private industry are on work for the federal government, mostly for the Defense Department. Our senior partners, the armed services, therefore, share the responsibility of better management of the engineers and scientists.

To the lay observer, there could at times be a better integrated statement of the development requirements of the services. There might be less duplications of demand upon scarce talents to invent the same kind of machines to do the same job in the same period of time. As an example, I have in mind the ballistic missile field where there are multiple efforts. These multiple programs must, in effect, compete with each other for engineering and scientific skills as well as for money facilities and management. This particular weapons program is urgent. Might we not have a better chance of acquiring some of these extremely difficult and important weapons sooner if we had fewer projects dealing with them to work on?

Industry might with better management do current tasks with fewer people. When I hear about 2,000 or more engineers on an airframe task, it impresses me as wastage. Increasingly complex tasks cannot be solved by merely increasing the numbers of people working on them. With 2,000 engineers on a single project, a disturbing number of them must be wasting their technical skills in administrative and other non-engineering tasks.

Scientists should be playing a more active role within the halls of industry. Scientists can render major contributions to quicker and more efficient engineering of a development when appropriately placed in the organization. This way we can get more inventions out of fewer people. I am not speaking now of the role of scientists, the important role in laboratories of broad, basic research. I am bringing them out in this statement, in part, into the firing line of management itself.

Engineers and scientists in the organization should be given time to help in the local school educational efforts. They should be given time to do some broad, basic thinking, to draw upon areas of physical theory that have been little used until now. An airplane to travel faster than a rifle bullet for hours on end takes this kind of free-wheeling thinking. Defense against a ballistic missile, which means the invention of a bullet to hit a bullet, requires venturing into unfamiliar realms of science involving collaboration of engineers and scientists.

We called on the scientists heavily during the last war. Many of industry's tasks today are similar in complexity or even greater than those pursued during the war.

There are a number of different ways of integrating within a single organization the scientific engineering skills and management efforts. None of them may be perfect. All have the objective of tapping all available resources of knowledge inside and outside the organization applicable to the company's problems.

We must, as does our Soviet competition, *utilize* our talents more efficiently. We must also, as does our Soviet competition, *recognize* our talented people more.

Our system at the moment is such that the only chance an engineer or a scientist has for maximum advancement is to get into administration. This may always be partly true, since there will be an increasing requirement for efficient administration in scientific and technical fields.

But there should also be opportunity for recognition of superior technical men who are either not qualified for or who are not used in administration. And this recognition should come not only in the form of remuneration and recognition from his chief, but from others in his field as well.

Publication in professional journals, presentation of papers, preparation of monographs should be encouraged and supported.

We cannot, as the Soviets do, force our bright young people into science. We must attract them into the field. Somehow or other we must establish national and social eminence to a greater degree than we have for our scientific and technical people, if we are to make these areas of enterprise interesting enough to draw and hold a growing number of talented youngsters.

In this regard, I am mindful of a current experience of a friend of mine, a scientist of international fame. He was bemusing the fate of his thirteen-year-old boy who has a high IQ and who is naturally interested in the sciences, and who is currently bending his efforts in making the high school football team. Both the father and the son feel that it is necessary, despite the fact the boy doesn't particularly care for football. The boy has already broken four pairs of thick-lensed glasses, but he is determined that he must make that football team so that he can carry on with his scientific work without being considered by his schoolmates as a highbrow.

That is not an unusual situation, and each of us in his own way contributes daily to the continuation of such a situation. Somehow, each of us must bring himself to work toward the day when out of every one hundred young Americans who know of Ted Williams and Mickey Mantle, at least one of them will know who Edward Teller and Theodore von Karman are.

Point the way how to get more and better mathematics, physics, and chemistry taught in our primary and secondary schools and taught to youth keenly interested in these subjects, and you will be showing the way to an America that will continue to be preeminent and prosperous.

FLOYD B. ODLUM

President of the Atlas Corporation which he founded in 1923, Mr. Odlum was born in Union City, Mich., in 1892 and was graduated from the University of Colorado. In World War II he was on the War Production Board. His wife is flier Jacqueline Cochran.

After Mr. Odlum's remarks, Dr. Leon Trilling of MIT's Department of Aeronautical Engineering—a Symposium Panel member—presented the following summary of how Russian industry uses manpower.—The Editors.

Dr. Trilling: I should like to try to describe for you how we think that

the Soviet industry operates and utilizes its manpower.

When one talks about developing a new element, one must start with planning this element. Now, the people who take care of this are primarily the graduates of a special school, the Zhukovskii Air Engineering Academy, situated in Moscow. These people, who have had some four or five years of college training, then have in addition five and a half years of graduate subjects devoted to the principles of air engineering systems and, of course, fundamental science.

These people within the air force and the defense industry and at the head of the design teams get together and outline the requirements of the new weapon. Here one might point out that the same people who have to sit and teach at the Academy may spend the rest of the day doing design work or doing research in research institutions so that the relationship between the research personnel, the design personnel, and the personnel who set the policy for requirements, that intercourse is very close. It may be a group of fifty or sixty people on whose shoulders the whole responsibility rests.

Now, this means that a great deal of responsibility rests on a few people, and there is opportunity for errors to be costly. But it also means that it is possible to move very fast when a new idea comes up.

To support this planning group, there are extensive research facilities. These, I think, can be described under two headings: Fundamental research is carried out, by and large, by people graduating from universities who have a rather broad fundamental background. An example of the work of a task force of this type comes to mind. In 1942, the year when the Germans were not far from the gates of Moscow, an extensive task force was formed under the lead of Soviet air dynamicists to develop the theory of supersonic flow. Now, supersonic flow was not yet the problem then as it was expected to become a practical problem in the next ten or fifteen years. So, a task force was formed which included professors who had specialized previously in mechanics and shop dynamics. These people plus a number of young scientists worked for four or five years and came up with a theory on supersonic flow past things and bodies which is equivalent in many, many respects to ours.

And now the more down to earth type of research, the development of prototypes. On the basis of information we have about this basic research, it is carried out in very large laboratories, financed by the Ministry of Production and the Ministry of Defense, and again conducted by an interlocking directorate of people who spend part of their time educating the people and part of their time supervising design and part of their time supervising research.

The actual design is carried out by groups; they call them OKBs, or special design forces. They are groups of designers trained in the weapon systems approach. This fits in well, you see, with the vertical integration described previously. Aircraft itself is the basic units around which their education has been concentrated, and around which design is concentrated. These design heroes apparently do not compete with each other. There is one, or at the most two, who specialize in fighters. There is a mixed group who were each in a separate group apparently and now are more interested in all-weather interceptors. Bombers seem to be more the responsibility of the people of another group, and so on. So there is not the competition that we have here.

This permits a very clear, rational use of the available engineers. But, again, it makes it possible that an error could be more costly so that is a calculated risk which they have taken and which is different from the calculated risk that we have taken.

When the design is prepared, a small number, two or three, prototypes are built, tested extensively, and when this is done, they are given over to a production engineering group associated with a specific mass production plant. This plant will produce a somewhat larger group of the prototype, which will then be tested for a number of months in the field by squadrons. At the end of this testing period, there will be a monster conference of the basic designer and the production designer and the representatives of pilots and maintenance people from the field. The design will then be frozen, no further changes will be permitted, and a mass production schedule will be started. Then, apparently, a new model will come into being much sooner than it is the custom with us.

It is my understanding from reading the press that the F-86, for instance, has been in operation for some ten years, and it still is, an operational aircraft with its latest modifications. While in the same time, with the Russian interceptor designs, we have had at least three of them and possibly now, there will be the fourth one. This has consequences in connection with their policies and practices of tooling and manpower use, which we haven't got time to enter. I thought that I should present some of these facts or inferences to show what they do with their manpower that is different from what we do, and how they must direct their best people into research, their not-so-good people to the production side possibly, and get the most knowledge for what is ahead.

To conclude this discussion, it would appear that insofar as executive ability is concerned our depot of talent is very much larger than theirs, to a large extent because our salary structure makes it attractive to become an executive. On the other hand, in the USSR, it is attractive financially to become a scientist in the fields of science development and engineering. In the field of research, of course, the educational system has not been determined over the scientists.

A good basic scientist is very important and is made much of there. In the field of development and engineering, where numbers are of some considerable importance, we are still ahead but they are drawing up to our level fast, and they are making good use of the manpower they have. In the field of labor, which unfortunately we do not have time to discuss, we have an enormous advantage, I think, in that very many young people in this country, through thinking apart instead of thinking together, become familiar with machinery on their own at a very early age. Our young men have a feeling for machinery which the Soviet young people, because of the lack of machinery for them to practice on, do not yet have.

They are trying to get around this problem which they recognize by intensive formal training, and also by trying to introduce automatic processing as much as possible. Although they have not yet, according to the press reports, put this plan into operation.

By and large, we are still ahead of them, it would seem to me, except possibly in the field of basic research. However, the tight control that they have over their manpower, their ability to assign task forces in groups to the job at hand, and the good judgment which they have shown on several occasions suggest that probably we should not become complacent about the potential advantage that we still have because they are making wonderfully good use of what they have.—END

Gen. Nathan F. Twining, Joanne Alford—Miss Airpower of 1956—and Gill Robb Wilson walk past an honor guard on arrival at the Airpower Panorama preview.

AFA Panorama—Talk of the Town

EVERYONE loves a parade—and it can also be said that everyone loves to look at displays and exhibits. And New Orleanians are no exception. The Airpower Panorama, held in conjunction with the AFA Tenth Annual National Convention in that Dixieland city, drew more than 83,000 visitors.

The Panorama was properly launched by such Hollywood personalities as Joe E. Brown, Jack Carson, Vince Barnett, and Irene Ryan at a preview and reception the night before the official opening in the Municipal Auditorium. Seventy-one exhibitors filled the booths with much of what it takes to keep America strong in the air. The displays ranged from small metal nuts to a full-size F-84 mounted on a zero-length launcher. Especially popular with the kids—judging from the patient line-ups—was a ride in a Link flight simulator. Other companies made a hit with them by handing out models of their aircraft. And the exhibitors, knowing Americans are a curious bunch, provided many things to peer into, listen to, or try on. Among those attending the preview were AF Secretary Donald A. Quarles; AF Chief of Staff Gen. Nathan F. Twining; outgoing AFA President Gill Robb Wilson; Joanne Alford, Miss Airpower of 1956; film star Jimmy Stewart, AFA charter member and past director; and many top military, aviation, and government officials.

AF Secretary Donald A. Quarles talks airplanes with a couple of youngsters.

As at the other AFA Airpower Panoramas in the past, the displays proved a popular meeting place for the producers and consumers, for the industry and the military, and for the average American taxpayer whose dollars buy the equipment that is needed for the defense of the US. As usual, the aircraft exhibits rated highly with the man on the street. One jet fighter, on display on Canal Street, was peered at, probed, and oh'ed-and-ah'ed over by about 40,000 people in one day alone.

The same stars who got the Pano-

(Continued on page 80)

At the Panorama preview—Joe E. Brown, Joanne Alford (Miss Airpower), Gen. Nathan F. Twining, AF Chief of Staff, and Gen. E. W. Rawlings, AMC Cmdr.

Panaroma preview stage show was among the convention events covered by TV.

Gill Robb Wilson seems to be enjoying a look at the inside of a jet engine.

Vince Barnett at Panorama preview.

Jack Carson performs at the Panorama preview. He was also at Wing Ding.

Comedienne Irene Ryan gets warmed up at the Panorama preview show.

At the Fashion Luncheon, Joanne Alford—Miss Airpower of 1956—shows off her Airpower Gown. With her are Jan Markstaller, left, and Helen Daines.

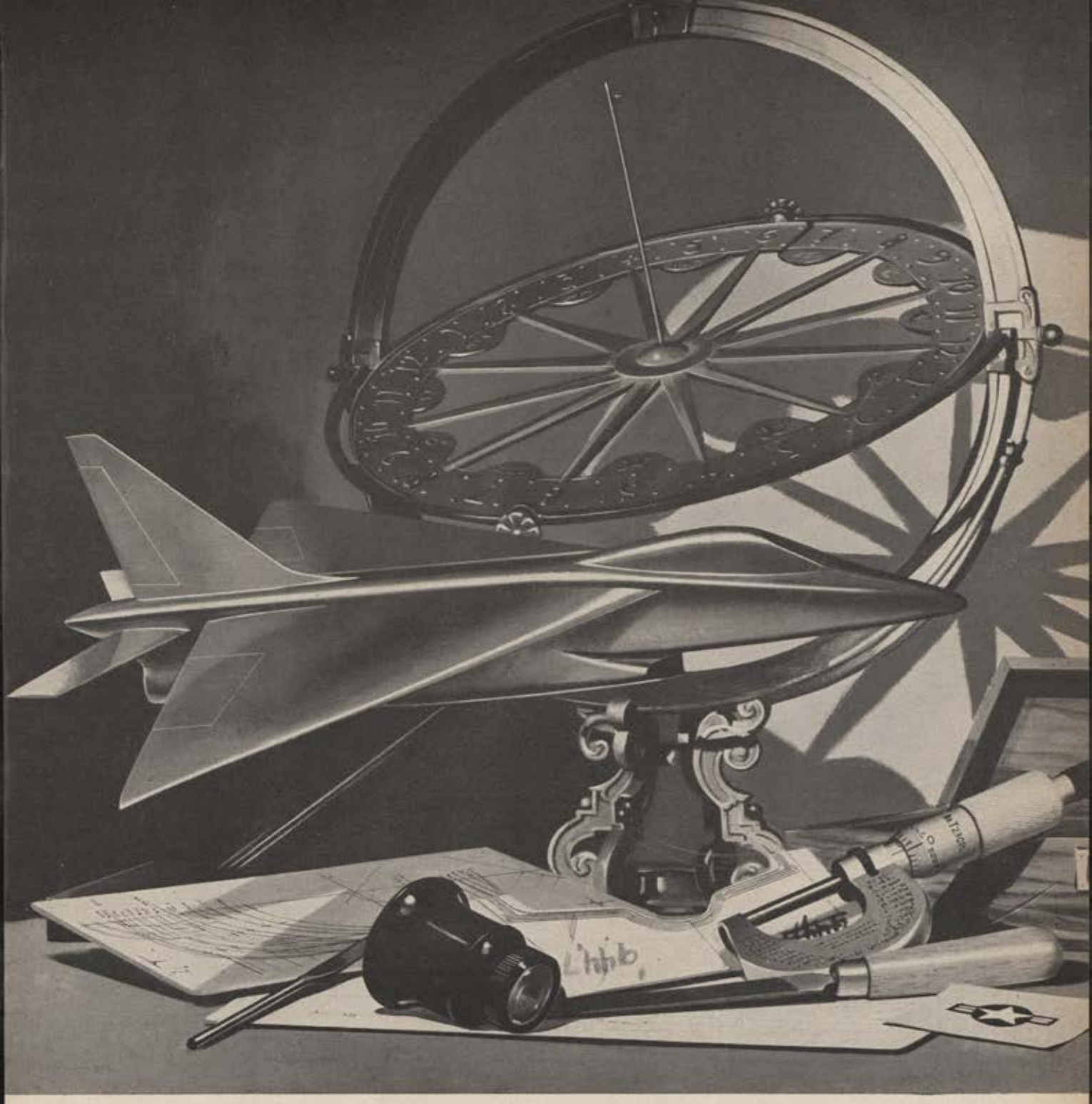
rama off to a good start were pressed into service again at the Wing Ding in the Roosevelt Hotel on Friday night, August 3. The AF's Airmen of Note, who played at the Panorama preview, also provided music for the Wing Ding.

For the ladies, the highlight of the week was the Fashion Luncheon featuring Joanne Alford—Miss Airpower—in the Airpower Gown (*see cut*) created by New York fashion designer Ben Reig. Miss Alford, a brown-haired, brown-eyed engineer for the Glenn L. Martin Co. in Baltimore, won the title after a nation-wide contest among women pilots. She is a native of Jacksonville, Fla., an air transportation engineering graduate of Purdue University, and has held a private pilot's license since 1951, with a total of more than 200 hours flying time.

Also at the Fashion Luncheon, Del-Vina Wheeldon, commentator for station WCKY in Cincinnati, Ohio, was given her AFA Citation of Honor for taking a ride through the sound barrier in an AF jet in order to describe her experiences in a series of radio programs aimed at women listeners.—END

Arthur Godfrey seems to be enjoying a pleasant interlude with CAP Cadet Captain Jacqueline Tench of Buckroe Beach, Va., and WAF S/Sgt. Evalene Eddy.

Miss von Vooren sings at Wing Ding.



TIME WELL SPENT— Northrop Aircraft's engineering and production team continuously pursues scientific developments to strengthen the national defense. Often this trail-blazing corporate effort commences long before a military requirement is known to exist. For example, when Northrop engineers started work on a supersonic trainer airplane, it was without the benefit of contract support. Now, two years later, this jet trainer is an important Air Force-Northrop project. The time which Northrop devotes to scientific exploration without guarantee of future returns has often paid dividends to the defense effort. It has proved to be time well spent in the interest of the American people.

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Pioneers in All Weather and Pilotless Flight

Sen. Stuart Symington receives AFA's highest award from Gill Robb Wilson.

The Flight Trophy is awarded to Lt. Col. Frank K. Everest, Jr., AF test pilot who was reported to have flown the Bell X-2 at more than 1,900 mph.

Beirne Lay, Jr., receives the Arts and Letters Trophy at the Awards banquet.

Gill Robb Wilson presents the Hoyt S. Vandenberg Memorial Trophy to Arthur Godfrey, radio and TV star.

The widow of Maj. Gen. Floyd B. Wood accepts a Citation of Honor which was awarded posthumously to her husband.

AFA's 1956 Airpower

THE HIGHEST honor given by the Air Force Association, the H. H. Arnold Trophy, was presented to Sen. Stuart Symington at the Airpower Awards banquet, climax to AFA's Tenth Annual National Convention in New Orleans last month. In all, during the convention, AFA presented six major trophies and eight Citations of Honor recognizing distinguished service in many fields of airpower.

Senator Symington, designated "Aviation's Man of the Year," was honored for "his determined and enlightened inquiries into the true status of our national airpower" and for "his repeated efforts to achieve armed strength consistent with the dynamic nature of the military requirement." The citation went on to say that "he has demonstrated legislative statesmanship of the highest order and has performed a great service for the nation." Senator Symington, who recently headed a Senate subcommittee investigating American airpower, received the same trophy in 1948, when he was first Secretary of the AF (*for his acceptance speech, see page 84*).

The other major awards and citations were:

• The Hoyt S. Vandenberg Memorial Trophy was presented to radio and television entertainer Arthur Godfrey, who was acting as Toastmaster for the banquet. The citation accompanying the trophy said that "public understanding remains the cornerstone of our air strength. Over many years Arthur Godfrey has combined his unique talents as a radio and television personality with his seasoned knowledge of aviation to provide valuable air age education for many millions of Americans." The trophy was named for the late Chief of Staff of the AF, Gen. Hoyt S. Vandenberg.

• The Science Trophy was awarded to Dr. Chalmers W. Sherwin, University of Illinois physics professor and formerly Chief Scientist of the AF, for his "distinguished service

AWARDS

Fourteen are honored at the convention in New Orleans

to airpower in the field of science." Doctor Sherwin, according to the citation accompanying the award, "has made outstanding contributions to the development of a long-range radar system of far-reaching implications." He has also contributed to work on cathode-ray tube radar indicators and indicator circuits, and helped develop fundamental improvements in airborne radar, including moving target detection.

• AFA's Flight Trophy was awarded to Lt. Col. Frank K. Everest, Jr., chief of flight test operations at Edwards AFB, Calif. It was reported during the AFA convention that a week earlier Colonel Everest had flown the Bell X-2 rocket research plane more than 1,900 mph. The citation accompanying the award said, "The thermal barrier looms ahead as the next great frontier in man's conquest of the sky. Lt. Col. Frank K. Everest, Jr., has blazed the trail along the thermal barrier frontier with skill and courage, advancing the state of the aeronautical art and contributing significantly to the security of this nation." The thirty-four-year-old pilot is a native of Fairmont, W. Va., and has been in command of all-test pilots at Edwards AFB since 1950.

• Beirne Lay, Jr., Metro-Goldwyn-Mayer screenwriter, received AFA's Arts and Letters Trophy "for distinguished service to airpower in the field of arts and letters." Mr. Lay, who commanded a heavy bomb group during World War II in Europe, was specifically honored for "bringing to the screen dramatic writing on the Air Force mission that is significant for its popular appeal and for a realism born of hard-won experience." Mr. Lay wrote the screen play for the film "Strategic Air Command" which starred Jimmy Stewart and June Allyson.

• Maj. David F. McCallister was awarded the Earl T. Ricks Memorial Trophy for winning the all-jet race sponsored annually by AFA (*see page 174*).

Besides its six trophies, AFA presented Citations of Honor to eight others for work in various fields of aviation. They were:

• Maj. Gen. Matthew K. Deichelmann, Commandant of the Air Force ROTC at the Air University, Maxwell AFB, Ala., who was honored "for distinguished leadership in bringing the Air Force ROTC program to a high level of military scholarship and thus advancing the cause of Air Age education." In his more than thirty years of service, General Deichelmann has played an active role in the development of aviation since he first took flight training in 1927, shortly after he was graduated from the US Military Academy.

• Trevor Gardner, former Assistant Secretary of the AF for Research and Development, who was unable to be present, was cited for "enlightened and courageous civilian leadership in behalf of adequate research and development for the United States Air Force." Mr. Gardner, who recently resigned from his AF position because he felt not enough money was going into research and development, has been closely associated with research and development projects for the government since 1948. He is a native of Cardiff, Wales, and a naturalized US citizen.

• William Barclay Harding was honored in absentia "for outstanding public service as the leader of a distinguished committee whose assessment of the nation's long-range requirement for aviation facilities stimulated positive action at the highest level of government." The report submitted by Harding's group focused attention on the critical need for an air traffic control system to meet the requirements of the approaching Jet Age. Mr. Harding, a partner in Smith, Barney & Co., a New York investment and stock brokerage firm, is a member of the Air Research Advisory Committee at Harvard University and the Institute of Aeronautical Sciences, and a governor of the Flight Safety Foundation.

• J. Earl Schaefer, Boeing Airplane Co. vice president and Wichita Division general manager, was honored in absentia "for distinguished public service through his dedicated and effective efforts on behalf of the men and women of the armed forces to make military service a more attractive and respected career." During the past six years, Mr. Schaefer has delivered countless speeches on "The Immediate Necessity for an Adequate Air Force in Being," and "Our Air Force—Its Progress and Its Needs for Continued Progress," as well as speeches on survivor benefits and other subjects aimed at making service life more rewarding.

• Col. Harry Shoup was honored "for outstanding accomplishments in the field of community relations contributing to a closer bond between the American people and their Air Force and thereby leading to a broader public understanding of the problems of the Air Age." While Colonel Shoup was commander of the 520th Air Defense Group at Truax AFB, Wis., he conducted a campaign to familiarize the citizens of Madison (near Truax) with the problems and responsibilities of the Air Force there. His campaign resulted in vastly improved relations between the AF and the community.

• Jack Webb, the "Sergeant Friday" of radio and television fame, was awarded a Citation of Honor "for outstanding accomplishments in the field of community relations contributing to a closer bond between the American people and their Air Force and thereby leading to a broader public understanding of the problems of the Air Age." Mr. Webb, an actor, producer, writer, and director starred in the Warner Brothers film "Twenty-four Hour Alert," which dramatized the AF's role in community relations and was based on the pamphlet "Shotgun Wedding" which was produced as a result of Colonel Shoup's (*see above*) efforts at Truax AFB. He was not present to accept his award.

• DelVina Wheeldon, commentator for radio station WCKY in Cincinnati, Ohio, was honored "for distinguished public service in the field of radio broadcasting contributing to a better understanding of the AF mission and giving new significance to the role of women in meeting the challenge of the Air Age." Mrs. Wheeldon is one of the few women to experience the sensations of flight through the sound barrier, and was the first woman passenger to fly faster than sound. She made the flight to gain personal experience so she could describe it to her radio audiences and create greater interest in the important role women play in the present-day

(Continued on following page)

airpower *(see* AIR FORCE, *August '56).*

• The widow of Maj. Gen. Floyd B. Wood accepted a Citation of Honor which was posthumously awarded to her husband "for combining the best attributes of scientist and airman in guiding the technical effort of the Air Research and Development Command through its critical formative period." General Wood was killed in the line of duty last April in a jet plane crash at Friendship International Airport, Md. He was Deputy Commander for ARDC at the time.—END

Col. Harry Shoup is cited for efforts in the field of community relations.

Maj. Gen. Matthew K. Deichelmann, ROTC Commandant, receives Citation.

DelVina Wheeldon, first supersonic woman passenger, receives her award.

Remarks by Sen. Stuart Symington, Aviation's Man of the Year, at AFA's Tenth Annual Airpower Awards Banquet

VERY HUMBLY and with much gratitude, I accept this honor, not only for myself but also for the forty-seven other Senators who voted the extra $900 million for the Air Force this year. . . .

When I found I was supposed to say a little something tonight, I made a couple of notes. One is that if this investigation on airpower has done anything, it has tried to eliminate the confusion and the mystery that has gotten into the question of airpower. It has cut through the "battle of words" as to just what is or is not tangible or intangible about airpower.

There is nothing intangible about a B-52, its price, or the fact it can go 8,000 miles, with refueling. There is nothing intangible about a Bison or a Bear, and the fact that they can do similar things. There is nothing intangible about the record of a dictator country for striking when it felt that it was ready and that it could do so successfully.

I would like you all to read the record of these airpower hearings. Especially I would like you to read the record of the sworn testimony before our Committee of Gen. Nate Twining, Gen. Don Putt, and Gen. Bill Irvine, after they had come back from their trip to Moscow.

I noticed in a speech General Twining made yesterday that he said we will stay ahead if certain plans are followed. First, he said that we are ahead, and that I believe. But also in this testimony, one of the greatest men who ever put on the Air Force uniform said that five-sixths of that lead had been overcome by the Soviets since World War II. Now, if in ten years you lose five-sixths of your qualitative lead, on which you base your justification for your quantitative give-up, where do you stand in the next ten years?

When General Twining says that we may stay ahead if we continue our planning, I'm sure he meant Air Force planning—not planning in the Bureau of the Budget. Air Force planning means seventeen wings of B-52s instead of eleven, with forty-five planes in each wing instead of thirty. It also means some seven billion dollars more in appropriations for the Air Force next year. That's the type of planning he meant when he talked about staying ahead. I know that to be fact because I asked him and he said that was right.

Now, I have just a couple of other points that, if I may, I would like to present tonight. . . . One is the often repeated assertion that we are stronger today than we have ever been before in peacetime. I submit to you that statement doesn't mean a thing. I heard it said, resaid, emphasized, and reemphasized a few weeks before Korea. Absolute strength or unilateral strength means nothing. What means everything is relative strength—strength as against a possible enemy. . . .

When we are proud of our strength—and we should be proud of our strength in the air—we nevertheless should never fail to compare it with the growing strength of the possible enemy. . . .

Do you believe that we, a peace-loving nation, will have more success negotiating with the rulers of the Kremlin and Peking from a position of relative weakness, or do you believe that we will have more success negotiating from a position of relative strength? That is the decision that must be made. The answer is clear.

I believe that in our form of government the people have the right to know all the facts that won't help a possible enemy. Reading the record of our hearings will help the people make their decision in this matter.

The Chairman of the Freedom of Information Committee of the American Society of Newspaper Editors put it well when he said: "The acts and judgments of those who are fully informed are their own acts. The acts and judgments of those who are only partly informed are, in reality, the acts and judgments of those who partly inform them."

And [Lyndon Johnson], the great, young Majority Leader of the Senate, put it as well as I have ever heard it, when he said: "The strength of a nation depends upon the will of the people. In a democratic form of government, that will can only be expressed if the people are informed."

I believe that the American people have a great basic desire to get the truth about airpower and about what is necessary to guarantee the security of the United States. And, as I thank you most humbly and gratefully for this wonderful award, I believe the American people are eager to do whatever is necessary to pass on to their children the blessed heritage that has been bequeathed to them—individual and national freedom.—END

Every wolf would like to eat a porcupine. Few of them get around to it What makes the porcupine's meat so good, of course, is the fact that he doesn't have to do any running. Wolves, by and large, are an ill-tempered, frustrated lot, while you almost never see a neurotic porcupine. He figures it's cheaper to carry a quiver full of arrows than to get ulcers from hiding. There are predators of the sky, too, and helping keep them in a state of frustration is REPUBLIC'S job building THUNDER-CRAFT.

25 YEARS

REPUBLIC AVIATION

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Planning

The Hon. Edward P. Curtis

SPECIAL ASSISTANT TO THE PRESIDENT
FOR AVIATION FACILITIES PLANNING

IT IS a particular pleasure for me to address this meeting of the Air Force Association today for a great many reasons. First, because I was associated with the early group which was instrumental in forming the organization, and secondly, because the Association and its industry guests here today are so vitally interested in and so much a part of the job I have undertaken for the President in the problem of planning for the most efficient use of our nation's air facilities.

When the Association was founded ten years ago, in New York, it was our hope and belief that it would grow to a position of real influence and authority in the development of the nation's airpower in its broadest sense, including civil and military. I think you will all agree that today the organization has attained much of this goal and is recognized as being able and ready to make its voice heard, independently and with the authority of experience on airpower questions.

The series of extraordinarily successful Jet Age conferences which the Association has sponsored in many localities has done a great deal to explain to the general public as well as to our membership many of the problems which the Jet Age is bringing to our communities. While we can be justifiably proud of what has been accomplished so far, we must not forget that there are continuing problems which will necessitate constant effort on the community level if we are to earn and keep the necessary public support for aviation. Jet noise, for example, is a genuine and pressing problem. We cannot ignore it and assume that our airport neighbors will accept it. If we cannot eliminate it or at least control it, we must do everything possible to explain why it must be there and what the jet plane means to everybody in terms of national defense and our whole economy. This is a continuing responsibility of the industry and our Association.

Air Force Association seen as important instrument in continuing program of public education as to problems which the Jet Age is bringing to American communities

for Airpower Progress

In our preoccupation with the problems connected with the present extensive use of military jets and the advent of limited numbers of commercial jets about 1959, we cannot forget that we are faced right now and in the near future with plenty of difficulties in our current operations with piston-driven aircraft. Due to a number of factors, but primarily because we grossly underestimated the rate of aviation growth in the past decade, our aviation facilities have not kept pace with the increasing demands being made upon them. As you well know, we are controlling our airways with a system largely designed in the DC-3 era, with an overloaded communications network, and in many instances inadequate airports. It is a tribute to the devoted efforts of the Civil Aeronautics Administration's personnel and to the skill of our civil and military pilots that the system has worked as well as it has. In spite of occasional accidents such as the recent tragedy over the Grand Canyon, the safety record of all segments of our aviation has been improving steadily during recent years.

The task, however, of bringing all these facilities up to date and providing for keeping them abreast or ahead of increasing demands is vitally important if this country is to stay ahead in the air. Some things we can do reasonably quickly to improve the situation, particularly with respect to air traffic control. Most of these are embodied in the Civil Aeronautics Administration's five-year plan which it is hoped to telescope into approximately three years, provided adequate supplemental appropriations are made available by the Congress. These include increased airport and long-range radar coverage, improved communications, and better approach lighting systems, among others. It is important that these be made available just as quickly as possible.

Our longer-range objective, however, includes many problems of which adequate traffic control is only one. We need an over-all plan for a national airport system which will give present and future airport operators some guidance in the type of facilities which should be provided including runway lengths, high-speed turn-offs, and the like. We need some estimate of the costs of these and other facilities and to determine as far as possible an equitable distribution of these costs among federal, state, and municipal agencies and the users of these facilities. Most importantly of all, we need some form of organization on the national level with authority to implement any reasonable plan which generally meets with the approval of the Congress and the various air interests which will be working under it.

My directive from the President covers the following points:

- The direction and coordination of a long-range study of the nation's requirements for aviation facilities.
- The development of a comprehensive plan for meeting in the most effective and economical manner the needs disclosed by the study.
- The formulation of legislative, organizational, administrative, and budgetary recommendations to implement the comprehensive plan.

The long-range requirements study is, of course, well under way. As many of you already know, it is being conducted by three organizations extremely competent in their respective fields—the Airborne Instruments Laboratory, the Cornell Aeronautical Laboratory, and the Aeronautical Research Foundation. Through the cooperation of many of the manufacturers here today, we have obtained much valuable information on the characteristics of future aircraft and the power plants which will be available for them.

Among other things, it is becoming apparent that the performance characteristics of jet transports like the DC-8

(Continued on following page)

and the Boeing 707 are such that they will not put nearly so much burden on our present facilities as many of us had feared. Extreme runway lengths in the order of 10,000 feet and over will only be required for very long-range intercontinental flights with full payload or under extreme conditions of altitude or temperature. On transcontinental flights, fuel reserves will apparently permit reasonable times in a holding pattern at destination or the ability to proceed to fairly distant alternates. There will be some traffic control problems, of course, but not so difficult as some of us had supposed. A survey of fourteen military and Civil Aeronautics Administration's radar sites to determine their suitability for radarscope photography has been completed, and photography will shortly be started to get an accurate record of all traffic in these areas under Visual Flight Rules as well as instrument conditions.

One of the cornerstones of an air facilities plan is the development of an air traffic control system capable of phasing in with the system we now have, but at the same time, to have the dynamic potential to expand to meet growing requirements. We are thinking here of air traffic control in its broadest sense to include the most efficient use of our airspace, an adequate airport system, as well as en route, approach, and landing control.

In anticipation of some broad brush, but useable requirement data within the next two months, we have organized a systems engineering team whose job it will be to prepare a master plan for such a traffic control system. The plan will include recommendations for such testing and development facilities as may be necessary to implement it. The systems engineering team of about eight includes some of the best scientific and practical talent available in the country today—and they are already at work. As they analyze the data and possible systems concepts and as they progress in the step-by-step development of the comprehensive plan we will hold regular seminars with the users of the nation's aviation facilities to be sure that the plan is developing in a practical and realistic manner.

The third phase of my assignment is the formulation of legislative, organizational, administrative, and budgetary recommendations to implement the comprehensive plan. In this third phase we have also taken action by starting to trace the evolution of our present government organizations and committees, both civil and military which are concerned with common aviation facilities. We want to know why they were formed, what they have accomplished and, if they have failed, to analyze the reasons why. The relationships of these groups concerned with aviation facilities to each other and the delineation of responsibility is important to understand. Certainly we must develop a simpler and more authoritative form of organization to administer effectively our common aviation facilities.

Obviously, no matter how energetically we tackle this job, it is going to take time—time to develop a plan and more time to implement it. The growth of aviation in the last ten years particularly has suffered badly from the lack of a long-range program so that we can well afford to spend some time on its preparation provided we can get action on it when it is completed. In the meanwhile, as I mentioned before, much can be done to improve what we have today.

When it comes to the implementation of any plan, there is much that our industry guests here today can do to be helpful. I refer particularly to the appalling length of time it takes to engineer, develop, and install any new elements of a system. Most of you are more familiar than I am with the record in this respect, but a few examples may be interesting. The Civil Aeronautics Administration initiated development of the VOR navigational aid system in 1937, but the first installation was not started until 1946—nine years later. Admittedly the war years influenced this one. After two years of experimental activity, development was begun on the common system Radar Beacon in 1949, and the first installations will not begin before next year. Work on Volscan was started by the Air Force in 1950, and the first production units were delivered six years later, in 1956.

There are dozens of other similar instances in the record. I realize, of course, that industry is by no means entirely responsible for these delays or even primarily so. Most of it, I am sure, is the result of red tape, complicated contractural procedures, and lack of prompt decisions on what is to be done. But, insofar as industry is in a position to cut down the tremendous lead time in these systems development and installations, you will make a real contribution if the work can be speeded up.

Before an audience of this kind, there is no need to emphasize the fact that we face a terrific problem in working out a sensible plan for the use of air facilities and in getting something done about it. A solution can only be found by using the best talent available in the field plus the cooperation of all of you interested in America's airpower. So far we have found the greatest willingness to help on the part of all segments of our aviation world.

The Civil Aeronautics Administration, the military, the airlines, the private and business flyers, as well as the industry itself have made every effort to assist our work by making available the information we need. We could not have asked for or expected better cooperation. If we continue to deserve and receive this same assistance as our work progresses, I am confident a solution will be found which will permit the kind of growth of America's air strength to which our Association is dedicating its efforts.—END

EDWARD P. CURTIS

Mr. Curtis, an Eastman Kodak Company vice president and National Director of the Air Force Association as well as one of the guiding forces behind the formation of AFA, was recently appointed Special Assistant to President Eisenhower for Aviation Facilities Planning. In this capacity he will direct a long-range study of the nation's requirement for aviation facilities. He was born in Rochester, N. Y., on January 14, 1897, and was graduated from St. George's School, Newport, R. I. (1914), and from Williams College. During World War I he served as combat pilot with the 95th Aero Squadron and was officially credited with six German planes destroyed. He was a major on General Billy Mitchell's staff after the Armistice. During World War II he went to England in 1942 as Deputy Chief of Staff of the Eighth Air Force, and subsequently became Chief of Staff to General Spaatz, then commanding our Air Force in Northwest Africa. He remained in that capacity until the end of the war in Europe, being promoted to the rank of major general in June 1954. Mr. Curtis's entire business career has been with the Eastman Kodak Co., beginning in 1920. In 1929 he was appointed sales manager of the motion picture film department. When he returned to the company after World War II, he was elected vice president in charge of motion picture film business throughout the world and also supervisor of general business in Europe and Latin America.

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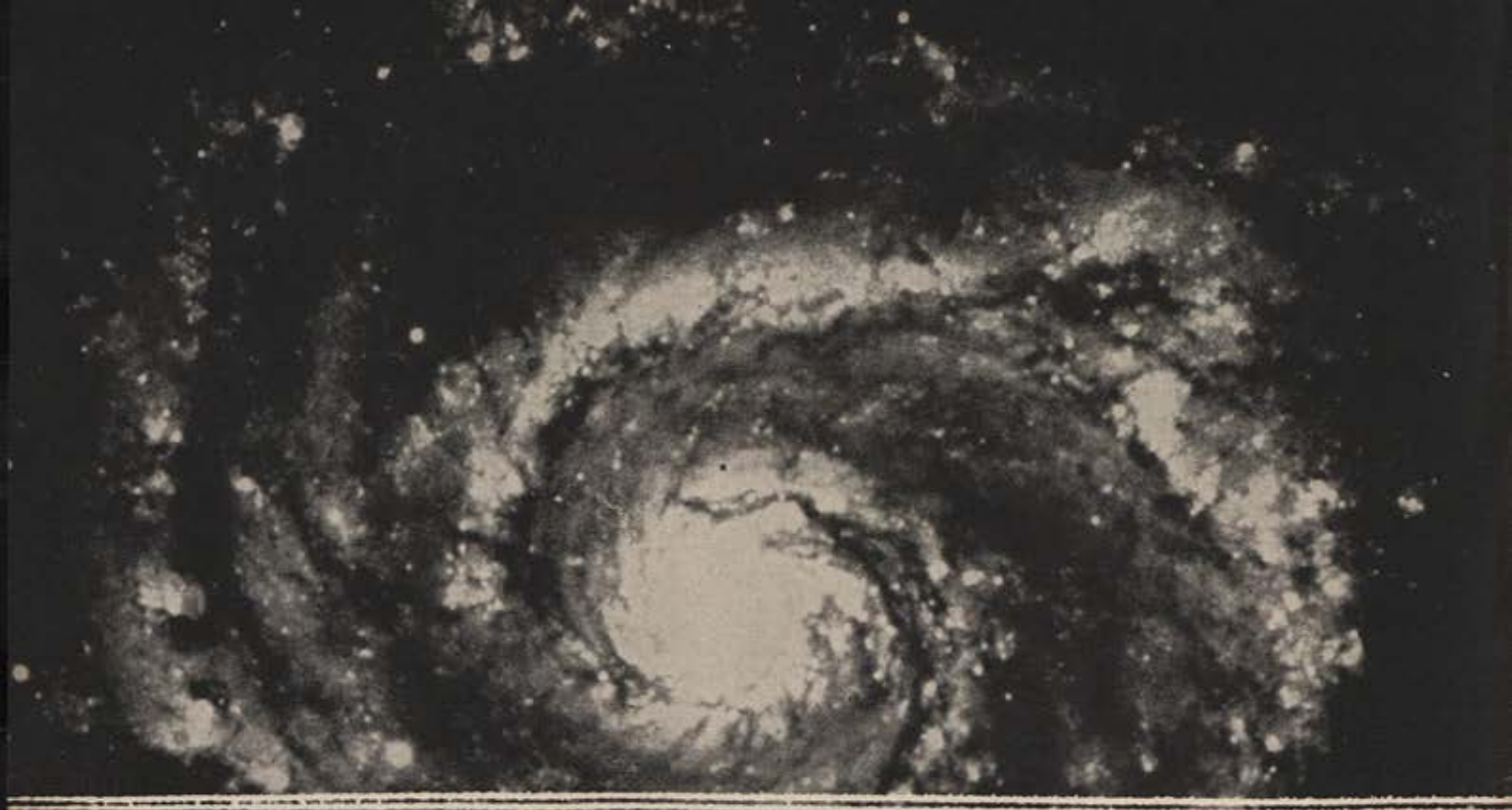


Lockheed scientists are designing

WINGS FOR THE ATOM

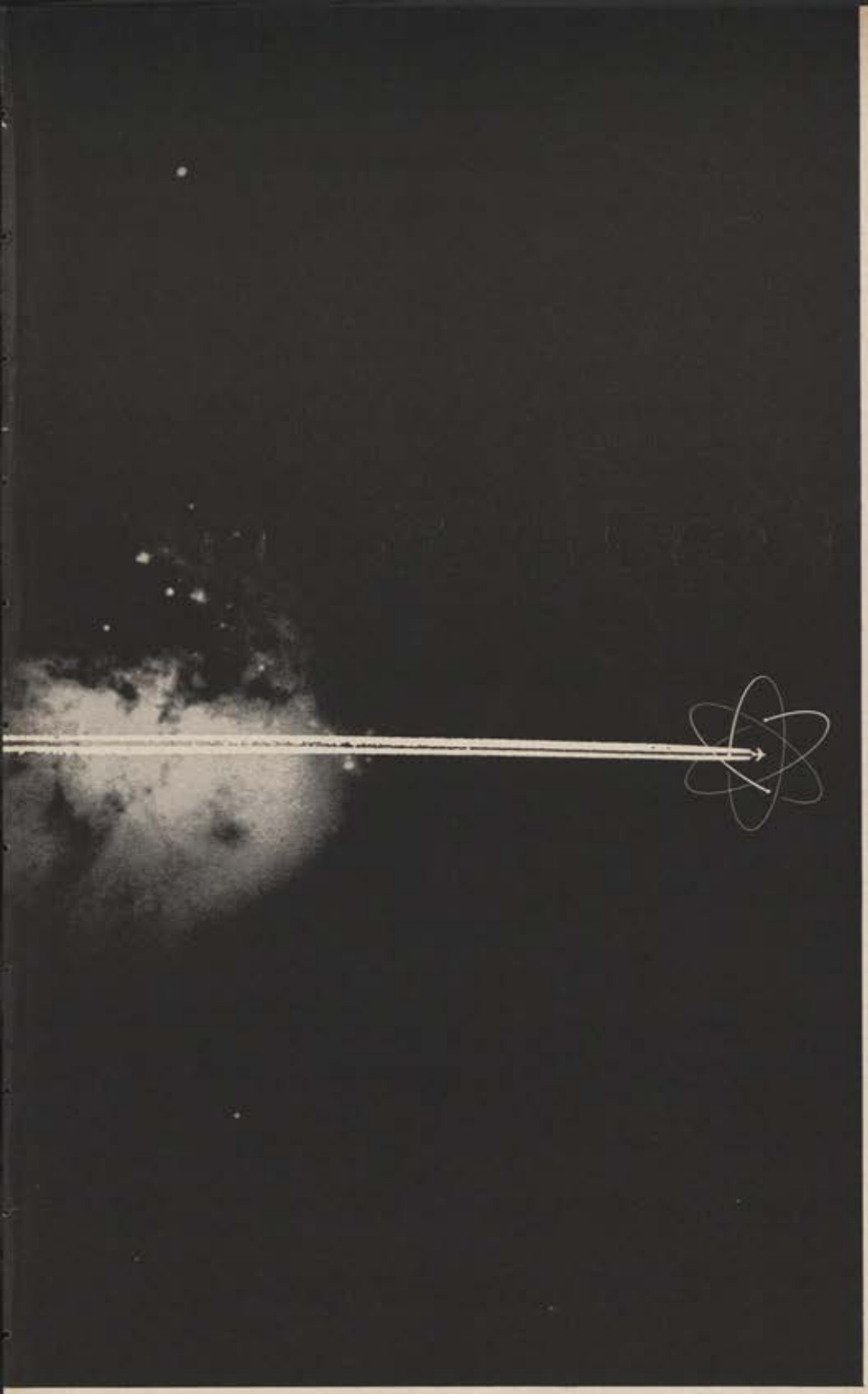
Domesticating the atom to serve mankind has intrigued science for over a decade. One top priority application, secretly under way for several years at Lockheed: developing a nuclear-powered plane as different from present types as a supersonic jet is from the first stick-and-wire biplane.

IMAGINE A GIANT AIRCRAFT SOARING ALOFT, NOT WITH TONS OF GASOLINE, BUT WITH A URANIUM FUEL SUPPLY NO BIGGER THAN A HANDFUL OF GRAVEL. EVENTUALLY, SUCH A PLANE-OF-THE-FUTURE—WITH THIS SCANT FUEL SUPPLY—WILL GIRDLE THE GLOBE NON-STOP BETWEEN SUNRISE AND SUNSET.

More than a dream, this incredible aircraft is now being developed by Lockheed for the U.S. Air Force despite problems of propulsion, structures and materials, thermodynamics, crew survival, producibility and maintenance unique in aviation. Old concepts are being shelved, traditional solutions rejected. *The kind of aeronautical advances that once took a generation of research are now being telescoped into a few months, even weeks.*

Soon several hundred nuclear scientists and engineers from Lockheed's Georgia Division will move to the North Georgia mountain country. There on a vast site—some 40 miles from U.S. Air Force Plant No. 6 at Marietta, operated by Lockheed—will be built the nation's largest facility for the development of atomic-powered aircraft.

The exact status today of U. S. atomic plane



development is still a military secret. But the strategic importance of the "A-plane" to our nation can hardly be exaggerated. It will be an aircraft with a new dimension—endurance unlimited. Its immense range and round-the-world patrol capabilities are certain to revolutionize air logistics—freeing military aircraft from shackles presently imposed by fuel capacity and airbase location.

THE DAY WHEN AMERICA'S FIRST NUCLEAR-POWERED AIRCRAFT BECOMES OPERATIONAL WILL BE ONE OF THE TRULY SIGNIFICANT DATES OF AVIATION HISTORY.

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LOCKHEED'S NEWS COLUMN

Detection of Heart Disease—*our nation's #1 killer—is being speeded with aid of Lockheed's battery of super-fast electronic brains that are correlating the studies sponsored by the Nash Cardiovascular Foundation. Ten minutes' work sandwiched between computations at the Missile Systems Division gives the cardiologist complete and accurate harmonic analysis of electrocardiograms that speed his vital research immeasurably . . .*

Radiant heating, first time used in *any* airliner, will be one of the many new creature comforts of Lockheed's up-coming propjet Electra. Heating wires in walls and ceilings work like electric blankets to give no-draft, no-hot-spot comfort . . .

Atomic plane concept on a recent cover of Newsweek was *not* based in any way on Lockheed's Georgia Division ANP (Aircraft Nuclear Power) Project. That plane will *really* surprise you . . .

25,000 Lockheed stockholders in every state of the union learned in mid-August that sales reached approximately $345 million for the first half of 1956. In a like period 20 years ago sales were less than *one* million . . .

Univac's newest cousin Si *(for Scientific) will be the top quiz kid in the battery of analogue and digital brains at Lockheed's Missile Systems' Computer Center. Si, first Model 1103A Univac in use, "thinks" up to 100 times faster than other computers . . .*

A nationally-known Los Angeles physician, after periods of intense nerve strain, goes to the airport, buys a round-trip ticket to New York on a Super Constellation, spends a quiet day at the Waldorf-Astoria, and comes back on the next flight. Says: "It relaxes me" . . .

Hercules C-130 performance data *just released show that the USAF strong-man can haul 20 tons of cargo right on the contrails of a fast jet tactical force. 100 mph faster than present combat transports, Hercules climbs fully loaded to 2500 feet altitude in just one minute.*

How AFA Can Help Recruiting

Brig. Gen. Arno H. Luehman
COMMANDER, 3500TH RECRUITING WING, USAF

I WANT you to know that I truly appreciate the opportunity to talk to you this afternoon briefly on a subject which has been described as the most critical problem facing the Air Force today. It happens that the responsibility for solving this problem is my particular job. I refer to the subject of Air Force recruiting.

If you will bear with me, I should like to refer back very briefly to the personnel procurement situation just a little more than two years ago this time.

The Air Force had recently been granted authority, effective July 1, 1954, to organize and operate its own recruiting service. Recruiting, up to that time, had been conducted by the Adjutant General of the Army jointly for the Army and the Air Force.

While recruiting autonomy provided the Air Force with greater control and flexibility in its personnel procurement, we who had to get the fledgling recruiting wing off the ground, faced a tremendous task. The Air Force needed 200,000 airmen during the next twelve months to replace those trained veterans of the Korean conflict who would leave the service as their enlistments expired. Starting from scratch, we had to organize and train a nation-wide sales organization and win public support if we were to come close to meeting this manpower objective.

The Air Force Association, I'm happy to say, lost no time in coming forward to help us with this big job.

On June 22, 1954, a little more than a week before our autonomous recruiting service took over, AFA sponsored, on its own initiative, a United States Air Force Manpower Conference in the Pentagon, attended by over one hundred representatives of its Industrial Associates and other key industries. The purpose of the conference was to help us generate the public support the recruiter so urgently needs to do his job.

General Twining, Chief of Staff, told this conference that the number one problem facing the Air Force was recruiting. He pointed out that it was not just an Air Force problem but one that should concern every American.

So we went to work to build our recruiting organization and train our recruiters and fight to make our objectives. The going was tough and we were out to get large numbers of men. We couldn't always be too choosey and often had to be satisfied if they passed the minimum tests.

Thanks to the support we received from the Air Force Association, from business and industry, and from our many friends of the Air Force everywhere, our recruiters got a good measure of the public support they so urgently needed. This support, combined with the good hard work and earnest efforts of our recruiters, resulted in a creditable showing for our first year of operation. We came within 5,000 of our year's objective.

As I said previously, our need for airmen was so acute that first year that we were often satisfied with applicants who met the minimum requirements. But the Air Force manpower problem always was and is one of quality rather than quantity. We need young men who possess the mental capacity to learn technical skills, who are capable of being trained to service and support our complex modern multi-million dollar weapon system.

The Department of Defense uses a yardstick to determine the mental level of recruits by separating them into Categories I (the highest) II, III, IV (the lowest). Each service is required to take a certain share of all categories, including IVs. A large number of these Category IV volunteers, particularly those in the lower segment grouping of Category IV, or with scores below twenty-one on the Armed Forces Qualifications Test, are untrainable.

So we may meet our objectives in numbers but still fall far short of the Air Force requirement in quality.

It was obvious that we must raise our sights if we were to fulfill the qualitative requirements of the Air Force. Because of this, we were able to persuade the Department of Defense to revise its policy and make it less restrictive. Whereas we had previously been required to take twenty-seven percent of all our non-prior servicemen from the Category IV mental group, as I said the revised policy reduces this to eighteen percent. It also permitted us to be selective and choose only those whom we considered a good risk for training. I assure you that we are taking full advantage of these concessions.

On June 30, 1956 our recruiting service completed its second full year of operation. Our objective for the twelve

months ending on that date was approximately 184,000 for all types of personnel. Quantity-wise, we missed our non-prior service objective by ten percent. Quality-wise, we showed a decided improvement over our first year.

Of our Category IV enlistees, some 20,000, over ninety percent, made AFQT scores of twenty-one or above.

Of our non-prior service enlistments, fifty-five percent were high school graduates against forty-nine percent of the previous year.

In prior-service enlistments, we averaged 3,000 per month compared against 2,000 per month the previous year, a fifty percent improvement which meant considerable savings of time and money in training and so forth.

Our cost per recruit for the second time was the lowest for any of the services by a substantial margin.

In addition to the prior service and non-prior service programs, our recruiters forwarded applications in other programs, for example, over 3,000 aviation cadets and navigators, 1,202 nurses and thirty-one WAF officer candidates.

Again we can thank AFA for its support; a most successful public service advertising campaign developed through Ruthrauff & Ryan, Inc., and help from our good friends everywhere for the public support that enables our recruiters to make their long hours of hard work pay off.

As a concrete example of what I am talking about, I would like to express our sincere thanks to "Jock" Henebry, one of your Directors, for the magnificent way in which he helped us launch a nurse recruiting drive up in Chicago last May.

Our recruiting service began its third year of operation on July 1, 1956. Our main objectives for the coming year are more concerned, as I said before, with quality rather than numbers.

First, we are striving for a more effective recruiting organization which will increase sales through more contacts and improved selling techniques. We are out to enlist a higher percentage of high school graduates and more trainable men with higher AFQT scores. We are out to enlist more potential career airmen. We want, above all, to maintain a minimum four-year enlistment and an all-volunteer Air Force.

But we face an even tougher job today than during the two previous years. First, we no longer have the GI Bill as an enlistment incentive; second, our competition is much stiffer than ever before:

From the shorter-term enlistments in the other services.

From the increased number of recruiters and greater recruiting effort being exerted by the other services.

From the high employment rate and increased efforts of business and industry to lure high school graduates.

The Air Force Association has pledged its support of the Air Force recruiting effort. Today we need your help more than ever before to bring the Air Force to full manpower strength.

Our Chief of Staff, in his recent testimony before Congress, stated that the Air Force is suffering from an acute manpower shortage. Other air staff officers and commanders have gone on record to the effect that *many of our aircraft are grounded today because the Air Force lacks trained men to keep them combat ready.*

Airpower without manpower is simply an empty boast.

The manpower problem becomes, therefore, a matter of national security that should be of grave concern not only to the Air Force, not only to the Air Force Association, but to every responsible American.

I would like to urge you to get behind your local Air Force recruiter and give him an assist. In some communities, he is the sole representative of the Air Force. To many citizens, in many cities, he *is* the United States Air Force. But he needs *you* to back him up.—END

Airpower without manpower is simply an empty boast. The manpower problem should be the concern of every American.

Night Fighters Luncheon, Roosevelt Hotel, Aug. 4.

ALL-WEATHER WEAPON SYSTEMS

Lt. Gen. Donald L. Putt DEPUTY CHIEF OF STAFF FOR DEVELOPMENT, HQ., USAF

PERSONALLY, and in behalf of the Air Force, I wanted to pay tribute to the night fighters of the past and the modern all-weather interceptor teams of today.

On constant alert, flying day and night under hazardous conditions in all types of weather, the fighter-interceptor teams are truly the unsung heroes of the cold war.

And when we speak of the interceptor teams as the unsung heroes we must also pay tribute to the other members of the air defense system—the ground crews, the men of the aircraft control and warning system, and the wonderful and patriotic people who make up the Ground Observer Corps, whose unselfish devotion to duty continues to be most important to our defense.

While air defense is a part of the over-all Air Force team, you probably won't hear as much about what they are doing as you do about other important members of the tactical team. However, as in a championship football team, we must have a good defensive as well as offensive team.

Our Air Force can continue as an effective deterrent to war only if we are prepared to defend ourselves on an instant's notice by maintaining the world's most powerful offensive and defensive team. That we plan to do.

Since the audience here includes some of you who were in the early night fighting business yesterday as well as you younger men who are in the fighter-interceptor business today, it might be appropriate to look back for a minute to see from whence we came and to look forward to where we are going in the air defense business.

Since it is impossible for me to match the wonderful prose of Sir Winston Churchill, I would like to take the liberty of quoting directly from his book, *Their Finest Hour.*

"Since the beginning of the war we had brought into active production a form of airborne radar called 'A.I.' on which the Air Defense Research Committee had fruitfully laboured from 1938 onward, and with which it was hoped to detect and close on enemy bombers. This apparatus was too large and too complicated for a pilot to operate himself. It was, therefore, installed in two-seater Blenheims, and later in Beaufighters, in which the observer operated the radar, and directed his pilot until the enemy aircraft became visible and could be fired on—usually at night about a hundred yards away. I had called this device in the early days 'the Smeller' and longed for its arrival in action. This was inevitably a slow process. However, it began. A widespread method of ground-control interception grew up and came into use. The British pilots, with their terrible eight-gun batteries, in which cannon guns were soon to play their part, began to close—no longer by chance but by system—upon the almost defenceless German bombers."

From this humble beginning during the Battle of Britain, the modern all-weather air defense system has been developed.

The equipment in the early days was crude but it proved effective and accounted for the destruction of a significant number of enemy bombers. A few American pilots flew the British night-fighters and from their reports and other information given to the United States we soon modified a number of Douglas A-20s to carry an SCR-540 radar.

They also provided a radar observer cockpit, painted them black and redesignated them the P-70. Thus, birth was given to the first American night fighter.

The 540 radar was big and bulky and the scope was difficult to interpret. To successfully detect the target and direct the pilot into positions for a "visual," the radar observer had to distinguish the target blip from all the many other echoes on his scope. None of the A.I. radars of World War II had a lock-on feature. Steering information was interpolated from the size of the blip, the distance that it extended on either side of a time base line and its rate of movement. Skillful manipulation of the controls was required to nurse the blip through the ground return and close to a point where the pilot took over for a visual blast with his cannons. Reliability of radar equipment in those days was extremely low. The radar observer carried his tool box aboard, however, and frequently performed first echelon maintenance while airborne.

The P-70s met with moderate success in spite of many problems. After a relatively short time the P-70 was replaced with the Northrop P-61 Black Widow. This was the first US aircraft especially designed for the night-fighting job. . . .

The P-61 was equipped with a 4 x 20 mm cannon in the nose and a remote control turret which contained 4 x 50 caliber machine guns. A gunner was then made the third crew member. The fire power of the Black Widow was heretofore unheard of in fighter aircraft. This fire power paid dividends on intruder missions as well as on interceptor missions.

The night-fighting job in those days was doubly hard. The GCI radar was short range and provided only meager information for the controller to direct the fighter into position where the radar observer could get a contact and continue the attack information on his own radar. Often two or three ground radars had to triangulate and coordinate through a central controller in order to reach acceptable ranges or to pinpoint a target. . . .

In spite of the mass disarmament at the conclusion of World War II, a handful of night-fighter crews remained on active duty. As soon as the dust had settled, a program was established to reactivate two night-fighter squadrons. Thus, a round-up of night-fighter crews, controllers, and maintenance men began. They were as-

sembled at Shaw Field, S. C., and formed the cadre for reactivation of the 414th and 415th Squadrons.

For a couple of years after 1946, those two squadrons were the backbone of the US night fighting force. The Northrop P-61s began phasing out in 1948 and were replaced by the North American Twin Mustang—F-82s. The F-82s, although obsolete soon after becoming operational, held down the night-fighting job until they started being replaced by the Lockheed F-94 in 1950. The phase-out of F-82s was slow and was not completed until 1953. During this period, however, they saw a great deal of action in the Korean conflict and, I might add, accounted for themselves in true night-fighter tradition.

The advent of F-94 interceptors with a new type fire control system, together with the air defense concept of requiring around-the-clock operation in all kinds of weather, was the beginning of a new era for night fighters. Although the name was changed to all-weather interceptors about this time, the mission was essentially the same.

Following the F-94A/B, came the F-89A/B/C using the same type of radar, then came the F-94C, F-89D with two-man crews and F-86D, a single seater, again with a new fire control system and armament—this time with a lead collision course capability which does not require getting on the tail of a target to shoot him down. The combination of high speed jet interceptors, lead collision fire control system and the 2.75 inch FFARs (*forward firing aerial rocket*) gave us a potent air defense weapon system.

It has been recognized for some years that in order to control large numbers of high-speed interceptors against large numbers of enemy aircraft, our ground control system must be modernized and advanced to keep pace with the airborne systems. Many studies were made by technical institutions and industry to determine what this system should be. In fact the Air Force considered the project so important that we contracted with the Massachusetts Institute of Technology to set up a special project known as Lincoln Laboratory. This laboratory was organized in 1951 to study the state of the art, and to plan and design an air defense system.

It was decided that automation would have to play a big part in this system if the immense job was to be accomplished. Thus SAGE (*Semi-Automatic Ground Environment*) was born and development started. To be compatible with SAGE, it was necessary to make the interceptors more automatic. By development of such equipments as TACAN, data link and AFCS (*Automatic Flight Control System*) we will soon be able to make the interceptor perform its entire mission with the exception of take-off and landing, automatically.

This year, the Hughes Trophy (sponsored by Hughes Aircraft Co.) went to the 317th Fighter-Interceptor Squadron, McChord AFB, Wash. Above, members of the squadron watch Lt. Gen. Donald L. Putt unveil the silver bowl. At right, Lt. Col. Paul R. Smith accepts the Wilson Trophy for the 133d Fighter-Interceptor Squadron, New Hampshire ANG, from Maj. Gen. Winston P. Wilson. Named for General Wilson, the new trophy is being sponsored by Lockheed, North American and Northrop.

In addition to the advantages gained by automation of ground and airborne equipment, a significant increase in kill potential is being realized with air-to-air missiles.

As you know, guns and rockets on a fighter-interceptor require great maneuverability on the part of the aircraft and skill on the part of the crew even with our modern electronic gunsights. You have to get into a firing position and be within a rather limited range and fly at high speeds.

The airborne target-seeking missile, like the Hughes Falcon, simplifies the whole problem. First, it has great range compared to past guns and rockets. This allows the interceptor to attack from farther out.

Second, the range of the missile can be converted into altitude. Instead of waiting to reach the height of the bomber, the interceptor can now aim upward and let fly from several thousand feet below. Carrying its own eyes and air supply, the missile can streak on up to meet the attacking bomber.

Of course, this means more safety for the interceptor crew, but most important this means saved time. Whether we use the Falcon's speed and endurance to attack from farther out or from below, we can attack much earlier. When an approaching bomber can move ten miles a minute, every second we can save in destroying it becomes extremely important.

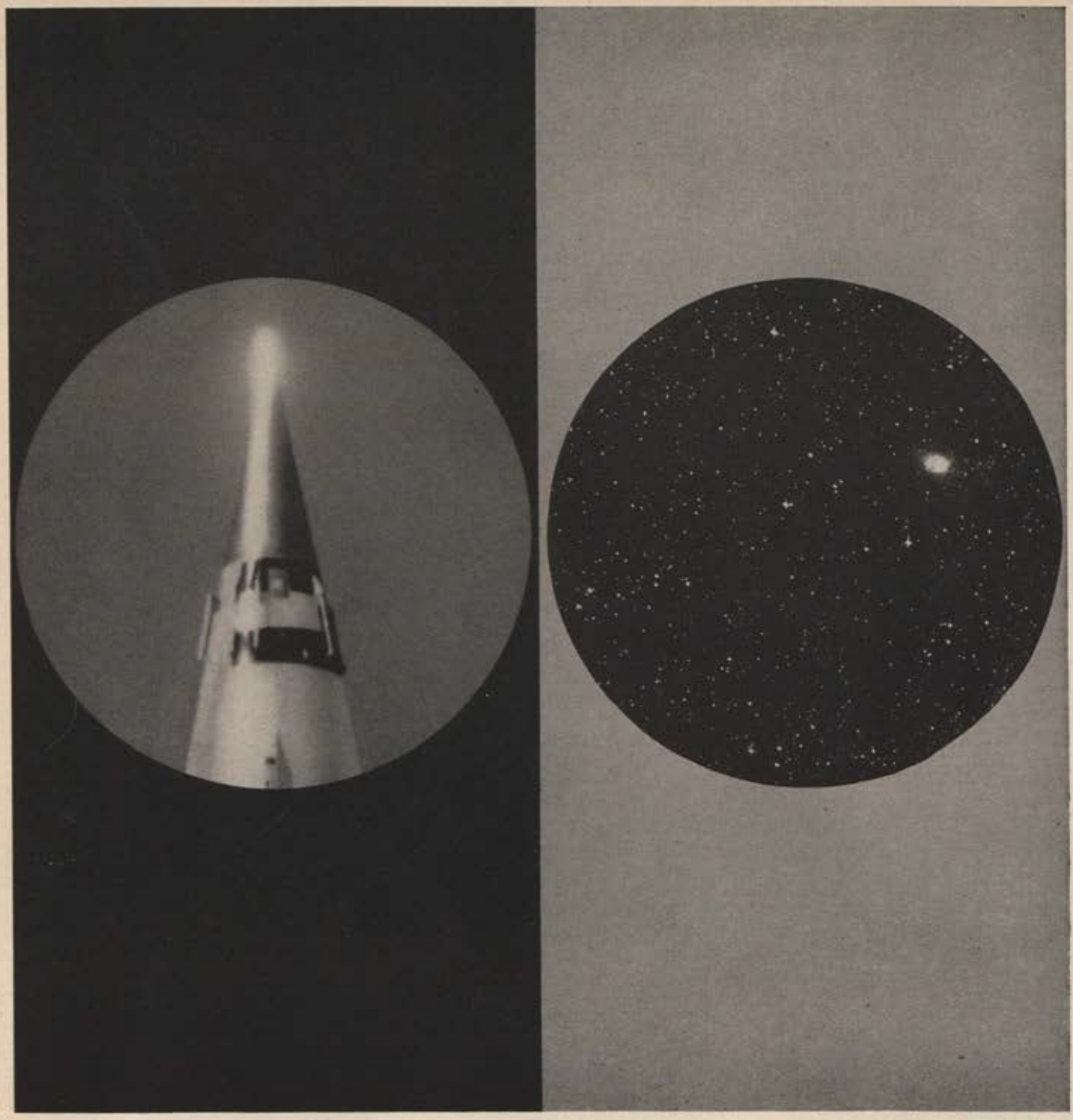
Both the Northrop F-89H and the Convair F-102A are equipped with the Falcon and are now in our operational units.

Improved designs such as the McDonnell F-101B and the Convair F-106A (*formerly the F-102B*) will soon follow and give us increased capabilities in speed, altitude, and armament—all of which are designed to combat the continually increasing enemy capability.

The combination of the airplane and missile into a weapon system suggests a design concept in which the aircraft is considered a weapon carrier rather than a fighter designed for combat acrobatics as in the past.

The electronics and aircraft industry has done a great job in the past as well as the present, but we and they must continue to seek greater simplicity, reliability, and economy. We must have smaller, lightweight equipment. We must all constantly strive to solve this problem.

In closing I want to emphasize that we in the research and development game realize the importance of a powerful air defense system. We will do everything in our power, knowledge, and resources to make and keep the air defense of this nation the most powerful and effective in the world.—End



HOT TIP

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MARTIN

Missiles—Key to Future Strength

The Hon. James H. Douglas

UNDER SECRETARY OF THE AIR FORCE

NEARLY eleven years ago, just after V-J Day in 1945 as I remember it, I attended an unusual meeting in the Pentagon. There were present the Air Staff and representatives of a few Air Force commands in Washington. General Arnold had called the meeting, and what stands out in my memory today are the concern he then expressed that the Air Force should not become complacent, and his conviction that great changes were in store for the Air Force. He talked about missiles and aircraft that would carry no pilot. He also predicted that to an extent not then foreseeable, missiles and pilotless aircraft would replace manned aircraft. He said the Air Force would be looking for boys with mathematical minds and scientific training, and that it would have to rely on research as never before, and be quick to adopt new weapon systems as they were made available by our expanding technology. As I have said, he emphasized the part that missiles and pilotless aircraft would play. He was careful not to say that they would arrive overnight, and indeed they have not. Now, however, they are almost upon us.

The great revolution in weapons and warfare was a reality when the first atomic bomb was dropped by a long-range bomber. Now that revolution is gaining new momentum as we proceed with the development of guided missiles.

Our ability to maintain the military strength necessary for our national defense will depend to a considerable extent in the years immediately ahead on our continuing efforts and our success in that guided missiles field. And as a major part of the Air Force effort has become the development of missiles, it seems most appropriate that our Association include in its tenth anniversary meeting this conference on this subject. There are limitations, as we have noted, on the information that can be made available at such a meeting as this, but I am sure you will find the program both informative and rewarding in conveying a real understanding of the Air Force activity on all fronts in the missile field. Problems of organization and manpower, as well as those of research and testing, will be discussed.

In introducing our conference discussion, let me call attention very briefly to what is happening in this missile development. The guided missile is already playing a part in air defense where it is replacing anti-aircraft artillery, and it will soon compete directly with interceptor aircraft. The air-to-air guided missiles will largely replace the rocket and machine gun. Missiles and pilotless aircraft such as the Matador are already supplementing long-range artillery and the fighter-bomber in the group support mission. And we are not many years from adding medium- and long-range missiles, both air-breathing and ballistic, to the manned bomber for the strategic bombing mission.

This progress in missiles raises two very tough problems that will require wise judgment on the part of our leaders in the Air Force, and the Army and the Navy, and on the part of the Secretary of Defense. The first of these, it seems to me, is to keep the Air Force budget within reasonable bounds during the period of introducing new missile systems while continuing adequate strength in manned aircraft units. And the second is to avoid wasteful controversy and an unnecessary overlapping of missile systems among the services. As to the Air Force budget problem, such progress is being made both in air defense and long-range strategic missiles that we are rapidly approaching the point of planning an operational capability in these new weapons. This means new problems of production, procurement, and storage, new problems in training, and of design and construction of new types of bases at home and overseas. The difficulty is one of creating a missile force and at the same time continuing to modernize our manned aircraft force, and to strengthen it by providing better dispersal of our long-range bomber squadrons. It seems clear that we should not look forward to adding a

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very substantial missile force on top of 137 wings of manned aircraft, but at the same time we must be very cautious in substituting missile units for interceptor squadrons or long-range missiles for bombardment aircraft. We must be selective in carrying development of particular missiles into operational systems. We must plan follow-on manned aircraft development in the light of missile capabilities. We must determine upon effective missile organization and deployment. There have seldom been more difficult problems for military judgment than that of phasing new missile systems into a modern Air Force, yet these risks we must take if we are to keep our Air Force modern and out in front.

The problem of avoiding wasteful duplication among the services in our missile development is in part one of fitting missile operations into the roles and missions of the services. The difficulties are obvious. In air defense we no longer have the clear distinction between anti-aircraft artillery and the manned interceptor. The spot defense missile can grow in range until it is effective as a medium-range interceptor. Such missiles as Honest John and Corporal are already affecting the requirement for fighter-bomber support of ground forces. And although the intercontinental ballistic missile is recognized as an Air Force weapon for its strategic mission, both the Army and Navy assert requirements for a medium-range missile very similar in characteristics to the ICBM.

I am sure these brief remarks should give substance to the situation that I described as requiring wise judgment, and I might add patience, by all concerned. The appointment of a Special Assistant for the Secretary of Defense for Guided Missiles is a recognition of these difficulties as well as of the urgency for securing operational missiles at an early date, and I am sure he will contribute to workable solutions of our present problems. In the Air Force, the task of introducing the right guided missiles at the right time, and of always holding the right balance between manned aircraft and missiles, and of continuing to press forward in our research and development efforts, is not an easy one. I am sure, however, that at the end of this morning's conference you will share my confidence in the ability and purpose of the officers you are to hear from, all of whom have an important part in our program. And I believe you will feel that the Air Force is on the right track and making good progress.—END

JAMES H. DOUGLAS

Mr. Douglas is Under Secretary of the Air Force. He was born in Cedar Rapids, Iowa, in 1899 and graduated from Harvard Law School in 1924. The following year he started a law practice in Chicago. In 1932 he became Assistant Secretary of the US Treasury. During World War II he became Chief of Staff of the Air Transport Command.

How The Air Force Will Use Its Missiles

Maj. Gen. Richard C. Lindsay

DIRECTOR OF PLANS, DCS/OPERATIONS, HQ., USAF

MR. DOUGLAS has emphasized to you the broad impact that the development and employment of missiles will have on the capability of the Air Force to achieve military objectives in support of our national policy. My purpose is to discuss with you the more specific role of guided missiles as it applies to the Air Force within the framework of that policy. To cover my subject, I shall first discuss the relationship of missiles to the concept of war; then I shall summarize the assigned responsibilities of the Air Force with regard to missiles; and next, I shall discuss the basis for establishing a guided missile force and the integration of missiles into the Air Force; and finally I shall briefly review the Air Force approach to the utilization of guided missiles.

First, then, let's consider the relationship of missiles to the concept of war. We realize that the characteristics and destructive powers of these weapon systems will have a considerable effect on the nature of war in the future. Missiles have characteristics which may be similar to, yet are not found in, any other weapon system. To be explicit, guided missiles are characterized by their twenty-four-hour, all-weather capability, high speed, greater range per pound of vehicle, greater operational altitudes,

larger circular error probabilities, primarily atomic warheads, relatively invulnerable launching bases, inflexibility once launched, large transportation requirements for the initial supply of the basic vehicle, massive launching capabilities, and their requirement for reconnaissance and exact target coordinates. A review of these characteristics indicates several features which will influence the concept of war. As a specific instance, consider the warhead impact. Since these vehicles are designed primarily for use with atomic warheads, their use in any war will, of course, have to be based on the stockpile of atomic weapons.

Another unique characteristic of a guided missile which will certainly influence the concept of war is the relatively invulnerable base from which it is launched. In other words, we are utilizing the principles of dispersion and hardening in constructing guided missiles launching facilities. Basically, these facilities are being so constructed that a direct attack by an atomic weapon on any one of the sites will not destroy more than one-third of the facilities or the capabilities of that site.

Now, I do not wish to leave with you the impression that missiles are applicable only in one type situation. The Air Force has requirements for guided missiles capable of performing in all the mission areas with the possible exception of airlift—which some people talk about, too. Further, whether the future war be general or local, the same basic USAF tasks are applicable. The principal difference will probably be restrictions as to the type and the use of weapons and the geographical limitations imposed by a particular situation; consequently, the guided missile force structure will not be substantially affected, regardless of the type of the war.

Now, suppose we turn to the responsibilities of the Air Force. All of you are, of course, familiar with the National Security Act of 1947. As you recall, it established certain primary functions for the Air Force. Generally speaking, they are: to provide for strategic air warfare; to furnish close air support for the Army; to provide for land-based air defense; to furnish air transport and aerial photography; to furnish air forces for joint operations; and to develop, either unilaterally or in conjunction with other services, certain doctrines, procedures, tactics, and techniques concerning aerial warfare.

At the time of their establishment these roles and missions appeared to be sufficient. But about two years ago the Joint Chiefs of Staff realized that the basic functions paper failed to provide adequate responsibility assignments in the field of guided missiles. Consequently, the JCS recommended to the Secretary of Defense an agreement on the Assignment of Responsibilities for Guided Missiles which would serve as a better tool for integrating these missiles into the combat inventory. This agreement, approved by the Secretary of Defense, contains the following assignment of responsibilities to the Air Force:

Air-to-air guided missiles are designed to improve the defense capability of aircraft to defend against enemy air forces. Air-to-surface guided missiles are designed to increase the capability of bombers and decrease their vulnerability. Since both types are purely "air" weapons, the Air Force was given the responsibility of developing, procuring, and employing them as they relate to the Air Force missions.

Since all services can effectively use surface-to-surface missile weapon systems, a line of demarcation is difficult. Nevertheless, the Air Force has the responsibility for developing, procuring, and using those which will (1) provide the capability of interdicting enemy land power and communications; and (2) provide the capability for the conduct of strategic air warfare (with emphasis, of course, on the intercontinental type of missile).

Since missiles of the surface-to-air type are designed for defense against air attack, the Air Force has the responsibility of developing, procuring, and using those which are designed to destroy enemy aircraft beyond a horizontal range of fifty miles. Additionally, these missiles will be designed and operated with ground equipment which employs the area concept for intercepting enemy aircraft.

As added guidance, the Joint Chiefs of Staff agreed that the service charged with the primary interest for developing a missile system should invite the participation of any other service which has an operational interest. An example of this is that Talos was developed by the Navy for shipboard use and is being bought by us for land-based utilization.

In consonance with its assigned responsibilities, the Air Force's program for developing guided missiles and guided rockets is designed to improve our combat capability. Each of the weapons under development is pointed toward accomplishing a specific, assigned mission; and, in spite of some uncertainties associated with these systems, technical estimates and development tests indicate that they will increase our capability. In line with this thinking, the plans and programs for integrating guided missiles are based on some specific guidelines.

First, because of limited funds and the need to concentrate on the primary mission of the Air Force, we will not develop missiles unless they fulfill tasks assigned as our primary roles and missions. Furthermore, we will delete from our program any missile which does not promise to increase our capability.

Second, considering the long lead times involved in attaining a combat-capable weapon system and the rapid outdating of weapon systems in the active inventory, we must make special provisions to insure the timely introduction of a guided missile capability. But we cannot require that the missile systems be fully proven prior to their introduction into the active inventory. In fact, the actual proof of a weapon system may never be accomplished short of actual combat. The decision to integrate them, then, must be made while guided missiles are in their infancy, primarily based on technical estimates and development tests. By making the decision at this stage, we can expect to obtain a guided missile force of significant size while the systems have a realistic capability, with the risk, of course, that in some cases funds may be spent for missile systems which will prove to have severe operational limitations.

Third, we are well aware of the two basic and somewhat conflicting requirements which are established by the over-all military mission: maintenance of an effective force-in-being, and the introduction of new and improved weapon systems toward the maintenance of a modernized force. As far as guided missiles are concerned, we have adopted a policy which is designed to fulfill both these requirements. This policy contains the following three basic principles:

1. A conservative level of production for guided missiles and allied equipment to provide a limited number of operational units will be established. These initial organizations are necessary to provide the combat commands with adequate data on the extent to which guided missiles will contribute to mission accomplishment. At the same time, we will have established a production capability at a

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minimum expenditure which can either be rapidly expanded or reduced, depending upon the outcome of the operational evaluation.

2. After we have activated initial guided missile organizations, we will conduct operational exercises to determine data on characteristics, capabilities, and limitations. Thus, we can evaluate guided missile units in relation to manned aircraft units. This evaluation, based on combat effectiveness, will determine a replacement factor and a relative combat value. Until this evaluation is completed, the manned force must be maintained as the force-in-being.

3. Because of the time required for this operational evaluation, the budget procurement cycle, which, of course, in turn develops the production level will be initiated before we complete the evaluation. The extent of production will then be determined from the results of the development tests and the data obtained from the early phases of operational evaluation.

A review of the technical estimates of guided missile characteristics in light of the target complexes, enemy capabilities, and the characteristics of aircraft indicate that in the foreseeable future the basic USAF task can best be accomplished by using a mixed force—aircraft and guided missiles. In general, it appears that we can best use guided missiles to destroy large or area targets, while aircraft would be used to destroy pinpoint targets and targets whose exact geographical coordinates are not known. An exception to this concept would, of course, occur in the air defense field where guided missiles are designed to be utilized against both formations and single aircraft and the coordinates are determined by the tracking systems.

To provide more definite information as to the use of the combined or mixed force, I should like to review with you the plan of employment by command or mission area responsibility.

Let's look first at *Strategic Air Operations:* In this area a study of the allocated targets reveals two basic types: the relatively large fixed target complexes, and fixed and dispersed pinpoint targets. The nature of these targets establishes definitive requirements on the delivery vehicle in terms of flexibility and accuracy. One of the problems which we face in the present state of development of guided missiles is the lack of pinpoint guidance accuracy which is obtainable, of course, with manned aircraft systems. For this reason, the intercontinental and the medium-range strategic missiles will be used against the relatively large fixed target complex or the war-making capability of the enemy. However, destruction of these targets would leave a substantial portion of the enemy's air delivery capability intact since it would probably be composed of dispersed guided missile launching areas and airfields. Manned aircraft will be used to destroy these targets because of the flexibility and accuracy which are inherent in that system.

Now, let's look at *Theater Air Operations*, those which are developed by what we call our tactical air forces. In the theater area of responsibility we must place a greater reliance on the manned aircraft. A review of the targets to be attacked by theater air commands reveals that a large percentage will be relatively mobile, small, and of an indefinite and pinpoint nature. Although tactical guided missiles are designed for mobility and flexibility, their inherent characteristics of accuracy and time to launch prevent their use against very small and fleeting targets. Nevertheless, the complete around-the-clock, all-weather capability of the tactical missile complements the versatility of the manned aircraft and will provide the tactical forces with a twenty-four-hour offensive capability. In addition, the advanced tactical guided missiles will provide the tactical command with a weapon system which has a longer range and is capable of striking deep-penetration targets. In summation, we can say generally that guided missiles will be used against the larger and more static targets while aircraft will be used against the small and more fleeting-type targets. The exception to this generality is that the guided missiles will be directed at assigned aircraft targets when weather conditions and intensive enemy activity limits use of manned aircraft.

Now for *Air Defense Operations:* It is in this area that the surface-to-air guided missile is capable of performing a greater portion of the basic mission. The guided missiles which the Air Force is now developing for this mission can be launched more rapidly and maintained for a longer time in a state of standby readiness than interceptor aircraft. Missiles of the surface-to-air variety provide a greater around-the-clock, all-weather capability than our present day-interceptors, and the sites from which they can be launched will be less vulnerable than airfields. The guidance and control for both the aircraft and the guided missiles are basically the same except that in the guided missiles the function of the pilot has been replaced by a black box.

Of course, this black box lacks the basic ingredient of judgment. This being the case, the role of identification must be solved by the long-range manned interceptors. Incidentally, the kill capability of the long-range interceptor has been greatly increased by the advances in the development of air-to-air missiles. In summary, here then, the surface-to-air guided missiles and the interceptor aircraft will be used to support the concept of defense in depth; that is, enemy aircraft must be engaged as far from their targets as possible with continuing engagement increasing in intensity as they approach the target.

Now we've discussed guided missiles as we see them in the immediate future. I would now like to go out on a limb to give you an indication of the impact of guided missiles on the future Air Force structure. First, however, I should like to remind you that there are many uncertainties associated with the development of future weapon systems and force structure. What I am about to say is not firm—looking at my crystal ball which I keep in my desk at work. Rather it is a look into the future, utilizing my best judgment of the job to be accomplished and the technical estimates of the characteristics of the fully developed weapon systems.

It appears unlikely that guided missiles will completely replace aircraft in any mission area during the foreseeable future. It looks as if the future force structure will be mixed in varying degrees depending upon the job to be accomplished. Although guided missile weapon systems will enhance the effectiveness of the combat force, they will have certain deficiencies. It is in this area that we must direct our development effort. Let's look at the direction in which we plan to go.

1. In surface-to-surface guided missiles, several delivery vehicles are being developed, each to provide an improvement over the preceding vehicle in terms of ability to penetrate enemy defenses with acceptable payloads. A common characteristic of the several vehicles is general deficiency in the CEP (circular error probability) and reliability areas. It is anticipated, however, that improvements will be made through research and development of fuels, power plants, and guidance systems. A look at the technical estimates of the surface-to-

(Continued on page 103)

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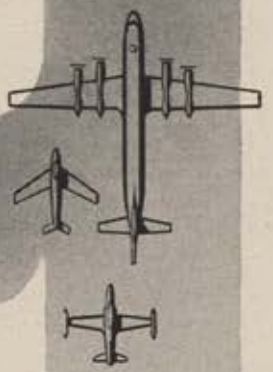

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surface missiles' future capability in relation to manned aircraft and the targets to be attacked indicates that about fifty percent of the Strategic Air Command's mission could sometime be accomplished with guided missiles. On the other hand, the Tactical Air Commander's mission appears to remain principally an aircraft responsibility because of the very nature of the tactical targets. It appears that only about thirty percent of the tactical targets would probably be suitable for attack by guided missiles.

2. Until the full potential of surface-to-surface guided missiles is realized, manned aircraft will be required to meet a large percentage of the USAF offensive requirements. But, because of continued progress in enemy defensive capabilities, the manned aircraft is becoming increasingly vulnerable. Air-to-surface missiles can assist in reducing this vulnerability.

3. Great strides are being made in developing our capabilities with air-to-air missiles and rockets with their associated fire control systems, and with high explosives or atomic warheads. The effectiveness of our fighter-interceptors will increase materially as these weapons come into operational use.

4. With development progress made to date we feel that the surface-to-air type guided missile is destined to play an increasingly important role in air defense. The manned interceptor will undoubtedly continue to play the primary role for some time; however, if these weapons continue to develop and possess the capability as expected, we visualize that in air defense they may be capable of taking over a greater percentage of the job than in any of the other areas. This could take place at the rate and to the extent shown on the chart.

5. While I am discussing the direction that we are going in this approaching guided missile era I am sure some of you have thought about what the requirement for reconnaissance will be to support these operations. With the advent of guided missiles a requirement exists for improving reconnaissance vehicles if an indication of damage inflicted is to be known. There are several systems on the horizon which show some promise. There is the possibility of utilizing some of our cruise-type guided missiles for this purpose wherein they could be equipped with reconnaissance gear, launched on a mission, and then recovered. Several of our surface-to-surface systems are being considered for this purpose. Also, the current program being conducted by the Navy for the development of a small diameter space satellite has interesting possibilities for the future. With advances in the small satellite and basic reconnaissance equipment one can envision the attainment of a large unmanned satellite which could provide electronic, photographic, infrared, and weather information. Guided missiles have definitely injected a new requirement for reconnaissance, and we must make plans to meet it.

In summary, gentlemen, I have attempted to outline the role of guided missiles in the Air Force to support the national policy and their relationship to the concept of war, the Air Force's assigned responsibilities for guided missiles, the establishment of a guided missile force, and last, current plans for integrating guided missiles into the Air Force. I can assure you the Air Force recognizes completely the potential of guided missiles as weapons in all our areas of responsibility, and we are making what we think are logical and realistic plans for their use.—END

MAJ. GEN. RICHARD C. LINDSAY

General Lindsay is Director of Plans in the office of the Deputy Chief of Staff, Operations, Hq., USAF. He was born in 1905. In 1941 he joined the War Department General Staff and became Chief of the Combined Joint Staff Division in 1944. In 1948 he headed a training wing at Sampson AFB.

Getting the Men To Man the Missiles

Maj. Gen. William S. Stone

DIRECTOR OF PERSONNEL PLANNING, DCS/PERSONNEL, HQ., USAF

THIS conference on missiles is unique in at least one very important respect, I feel, and that is, that it has on its agenda the item of manpower for consideration along with the new weapon systems. Generally, in discussing problems associated with the development of a new weapon, we are concerned chiefly with the factors of cost and production in relation to performance in terms of

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speed, range, accuracy, and firepower. And we usually have inserted somewhere along the line in our plans the rather innocuous phrase that "personnel will not be a limiting factor."

From the standpoint of quantity, perhaps, this is an acceptable treatment of the program, but it completely ignores the problem of quality. And the fact is that you have to match every technical advance in weapons with a comparable increase in the intelligence, the skill, and the dedication of our people.

Admittedly, there has been a growing appreciation of this qualitative requirement in recent years. People will now acknowledge that it takes a better man to fly a supersonic aircraft than it did to throw a spear. However, this concession will not improve our position unless we take into account the specific demands that are imposed on our people by the new weapon systems they must keep in working order to be able to use and sustain it.

Where new planes and electronic devices are concerned, we have spelled out most of the mental and physical attributes our personnel must have. We must now consider, in addition, what capacity they will need to cope with the exacting duties and job environment which are peculiar to missile operations.

First, there is the matter of sheer technical complexity in the equipment itself. This has introduced a new series of highly specialized and challenging jobs. They call for expert knowledge and a high order of skill in the adjustment of propulsion and pressure systems, guidance and control mechanisms, and the like. When you consider the critical importance of safety measures to be observed in all of these jobs plus the need for constant readiness, you can come up with only one answer concerning skill level: The people who man our missile sites must be professionals. They must have a far greater measure of competence than we have ever demanded of military personnel before down through all the grades.

In moving toward this level of achievement a part of our efforts must be devoted to an improvement of our systems of personnel selection and training. We are now using and constantly revising and refining a series of tests that will predict—with considerable accuracy—a person's ability to absorb highly technical training. As we are perfecting these, we are perfecting also the techniques, devices, and methods for giving this instruction.

However, even assuming that we can turn out specialists who are fully qualified on graduation, there is this additional question before us. How do we keep our people geared to a constant tempo of best effort and attention in the operational climate that our missile programs will present? Several powerful and traditional factors of motivation will be absent. For example, our people at missile sites will not have that sense of group achievement that comes from maintaining and operating our planes on combat maneuvers.

They will not have the same sense of individual achievement that attaches to outstanding air crew performance.

There are without doubt equally valid sources of job satisfaction that can and will be identified and established in our missile units. But it will take good planning, good insight, and splendid leadership to replace the incentives that have been removed by circumstance.

Now let's look at the dispersal factor and see how it will affect the morale and service motivation of our people. The location of these sites may be many miles from support bases and population centers. As a result, our missile people will be deprived of community associations they can now enjoy at many of our bases. And those who are married will have to find homes at a considerable distance from their jobs in all probability. Further, they will not have the assurance, as many of our people do now, that their performance is observed, admired, and appreciated by a large segment of the public.

As a final comment on the effects of dispersal I should like to emphasize the increased demands they place on initiative and self-reliance. Supervision of missile teams cannot be as direct as for aircraft elements. As a result we must have people who can act promptly and intelligently to meet varying situations. We must have people who are instantly responsive to a system of control that will extend to remote areas in a wide pattern of deployment.

These are some of the important manpower implications of our missile program. They clearly require an intensification of effort to get the best people, to give them the best possible training and then, most importantly of all, to keep them in the Air Force.

In this area we are making progress but many problems lie ahead. On the plus side we have succeeded in reducing our mandatory quota for low aptitude—so-called Category IV people—coming into the Air Force. This gives us a larger proportion of intelligent airmen, but the proportion is still not high enough.

As I mentioned earlier, we are also improving our training system.

Our major problem is that of retention, keeping the people who have been trained at great expense to perform vital and demanding jobs. From an economic standpoint alone we cannot continue indefinitely the extravagant practice of hiring a new Air Force every four or five years. More importantly we cannot permit our combat readiness to be jeopardized for the need of skilled, experienced, and dedicated people.

Thanks to recent Congressional actions that have provided more pay, improved housing and medical care for service families, and other benefits together with improved methods which have been generated within the Air Force for handling people, we have made impressive gains in reenlistments.

However, we still are not keeping the people we require for operations in the Jet Age and the Missile Age. This calls for continuing action to increase the inducements for our people.

An important phase of this effort is being carried out now by the Cordiner Committee, appointed by the Secretary of Defense, that includes distinguished civilians and military officials. As a basis for proposing actions that will help meet the skill requirements of all the services, this group is visiting military bases around the world.

MAJ. GEN. WILLIAM S. STONE

General Stone is Director of Personnel Planning, Deputy Chief of Staff, Personnel, Hq., USAF. He was born in 1910 and graduated from the US Military Academy in 1934. In 1938 he received a Master of Science degree in meteorology from the California Institute of Technology. He became Chief of the Weather Reports Division at Air Corps headquarters in Washington during World War II. In 1946, he became Chief of Staff of the Air Weather Service. After graduating from National War College, he went to Hq. US Air Force in Europe as assistant chief of the Plans Division, becoming chief of the division in 1952. In 1953 he was appointed Deputy Director of Personnel Planning at Hq. USAF.

In another move to learn more about the attitudes of service people toward military life, the Air Force has appointed study groups composed of selected airmen, and their wives, from various technical career fields. This program we called "Operation Searchlight," and it should tell us what the airman thinks and what his wife thinks about our personnel policies and actions. We have asked for views and suggestions all the way across the board. On my way down here from the Pentagon I had an opportunity to meet the members of these groups. Judging from their interest and their positive constructive attitude, I am convinced we will receive many helpful comments. This will be important to us in evaluating our policies and in making those changes that promise a further improvement in our retention rate.

I hope that my remarks here today have brought home to you some of the unique manpower requirements that are being introduced by our missile operations. Their most important meaning for all of us is that our total combat capability is determined just as much by the performance of our people as by the performance of our weapons.

Manpower is now, and may continue to be for many years to come, our number one problem.—END

How Much Can Missiles Really Do?

Lt. Gen. Thomas S. Power

COMMANDER, AIR RESEARCH AND DEVELOPMENT COMMAND

FEW WEAPONS have ever caught the fancy of the public as have guided missiles. Pictures and movies of spectacular launchings, the promise of long-range flights at tremendous speeds and altitudes, and the uncanny black boxes which take the place of the human pilot, navigator, and bombardier—all have fired our imagination.

Actually, the guided missile is not a new weapon. Depending on the definition as to what constitutes a guided missile, we can go back hundreds of years, to the fire arrows launched from catapults and to the rockets used by the famed British Rocket Corps in the Eighteenth Century.

However, even taking the strictest definition of a guided missile—an unmanned aerial vehicle, carrying a warhead and guided to its target while in flight—you can go back to World War I when the Air Service built production models of what was called a Flying Torpedo, a small aircraft-type missile powered by an internal combustion engine and propeller.

In the course of World War II, rapidly advancing military technology permitted increasing operational employment of guided aerial weapons, ranging from guided bombs such as the American Razon and the German Fritz X, to the V-1 semi-guided missile and the V-2 ballistic missile.

But it took the major improvements in jet and rocket engines as well as in guidance and control during the years following World War II to assure the guided missile a prominent place in the arsenal of military weapons. Today, more people know more about guided missiles than a handful of competent scientists knew but a few years ago.

And herein lies a great danger. The publicity given to some spectacular successes and the speculations of imaginative writers have tended to create a somewhat distorted and exaggerated picture of what guided missiles can do today and what they may be able to do tomorrow.

As of now, the Air Force possesses two operational missiles—the surface-to-surface Martin Matador and the air-to-air Hughes Falcon. Other missiles, ranging from guided aircraft rockets to ballistic missiles, are presently in various stages of development.

There is no doubt that our operational missiles are effective weapons and that the missiles now under development hold much promise. But it must be realized that, while the concept of the guided missile may not be new, the science of guided missiles is still in its infancy. We are still facing problems in reliability, in materials, in fuels, in electronics, and in many other fields. We are confident that we shall solve these problems, but it will take time.

Even when guided missiles are adopted for operational use as dependable weapon systems, manned weapon systems will remain as an important part of our Air Force structure to carry out the roles and missions of the Air Force. This point has already been well stated.

(Continued on following page)

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Missiles can and will be capable of performance far beyond the performance limits of weapon systems carrying human crews. But no matter how ingenious, how complex, and how advanced their guidance mechanisms, guided missiles cannot cope with contingencies which have not been previously keyed into them. Only the human brain can make important decisions quickly in unexpected situations.

Undoubtedly, misconceptions about the present and future roles of guided missiles have been caused and fostered by a lack of detailed information about them. In view of the potential importance of such weapons, it was, and still is, necessary to withhold, for security reasons, most data pertaining to their status, progress, and capabilities.

But there is much that can be told without endangering national security and, I believe, enough to give the public a clear picture of where we stand in this field and where we expect to go. For this reason, all of us in ARDC are grateful for this opportunity to present to you an account of some of our missile developments.

We know too little about the Soviet effort in this field to make valid comparisons. But there is little doubt that the Soviets recognize the potentialities of the guided missile as well as we do and that they are using every means at their disposal to achieve superiority in this area.

For this reason, we must do the best we can to insure our qualitative supremacy in guided missiles just as we are endeavoring to achieve and maintain qualitative supremacy with respect to all of our other weapons. —END

LT. GEN. THOMAS S. POWER

General Power is Commander of the Air Research and Development Command. He was born in 1905. He completed flying training in 1929 and was commissioned in the Air Corps Reserve. During World War II he served in North Africa as Deputy Commander of the 304th Bomb Wing and as Commander of the 314th Bomb Wing on Guam. He acted as Assistant Deputy Commander during "Operations Crossroads" atomic bomb tests at Bikini Atoll. In 1946 he went to Washington as Deputy Assistant Chief of Air Staff for Operations and in 1947 he became Chief of the Training Division in the office of the Deputy Chief of Staff for Operations. He went to London as Air Attaché in 1948. Later that year he was assigned to the Strategic Air Command as Deputy Commander.

Organizing the AF's Missile Research and Development Effort

Brig. Gen. Donald R. Ostrander

ASSISTANT FOR GUIDED MISSILE SYSTEMS, HQ., ARDC

SINCE THE occasion of the first powered flight by the Wright Brothers in December 1903, man has been constantly striving to make flight more and more automatic. The ultimate in automatic flight is, of course, the guided missile. A little more than a decade after this first flight, as General Power mentioned, Orville Wright, "Boss" Kettering, Elmer Sperry, and Gen. "Hap" Arnold headed a small group of engineers who were promoting the development of our first guided missile—they called it a Flying Torpedo.

You see the efforts of this group culminated in the successful launching of this vehicle in September 1919. Since this original effort, aviation with its associated technical arts in the areas of propulsion, aerodynamics, and electronics has progressed tremendously. Compared with this early venture, our guided missiles of today are completely automatic weapons of greatly increased sophistication and complexity and tremendously increased capability.

From this you can see that the Air Force's interest in guided missiles dates back to the days of World War I. Sinoe that time, our efforts in this field have been continuous, although sometimes they have been limited because of the meager support of any military research and development in the post-World War I period.

World War II ushered in a dramatic new era of technological progress, wjth the atomic bomb and the V-2 missile standing out as probably the major military breakthroughs, and it led to an increased emphasis on research and development in post-World War II. A major portion of the Air Force research and development effort since that time has been directed toward the development of guided missiles and the supporting technical fields such as aerodynamics, propulsion, electronics, and so on.

The technical leadership in this development program is provided by the Air Research and Development Command. Before discussing the operations of the command itself, how-

(Continued on following page)

ever, I'd like to take a look at the over-all guided missiles organization, starting at the top.

In carrying out our job, the necessary resources and directives come to us, of course, through a channel which starts with the Congress, which appropriates the money to support our operations, and goes through the President and the Department of Defense, which administrates the over-all operations of our military departments. At the Department of Defense level, a Special Assistant for Guided Missiles coordinates the missile development programs of the three services.

At the Department of Air Force level, this channel of control extends through the Secretary of the Air Force to the Chief of Staff who has an Assistant Chief of Staff for Guided Missiles, who acts as his primary advisor on all missile matters.

At the operational level, the Air Research and Development Command is responsible for planning and managing the Air Force guided missile development program. At headquarters ARDC, an Assistant for Guided Missiles has been established to coordinate all of this activity. Because of the importance of the ballistic missile program, a special organizational structure has been superimposed upon this basic structure.

Within the Air Research and Development Command we have formed a special organization, the Western Development Division, to manage the Air Force program in the area of ballistic missile development. Considerable authority has been delegated to its commander to expedite this vital and high-priority development program. *[See Photochart, page 111.]*

To expedite the review of the program and to make necessary decisions quickly, the Air Force has set up a Ballistic Missiles Committee, headed by Secretary Quarles, and having representation from each major staff agency which must review or support the program.

A similar committee structure has been established at the Secretary of Defense level under the Special Assistant, Mr. Eger Murphree, and as special scientific and technical advisors to the Ballistic Missiles Committee, a Scientific Advisory Committee has been formed of the top civilian scientists of the nation, and headed by Dr. John von Neumann.

Now, let's take a look at the part played by ARDC in carrying on the research and development program for guided missiles. In carrying out this responsibility each of the major research, development, and test centers of ARDC plays a part.

The headquarters of the command is located at Baltimore, Md. It is from here that the over-all program of guided missile research and development is planned and directed.

A portion of the headquarters is located at Dayton, Ohio. There, ARDC works side by side with the Air Materiel Command in the Weapon System Project Offices—or WSPOs. It is the Weapon System Project Offices that work daily with industry in managing the individual missile development programs.

Also, as I described to you before, the Western Development Division located at Los Angeles, is also a part of headquarters ARDC and it performs a similar function for the ballistic missile programs.

At Washington, D. C., is located the Air Force Office of Scientific Research. The efforts in the area of basic research contribute across the board in the many scientific fields which contribute to missile development.

Located at Dayton, Ohio, is the Wright Air Development Center. In its various laboratories it provides answers in such technical areas as materiels, aerodynamics, propulsion, and airborne guidance and control systems.

The Rome Air Development Center at Griffiss AFB, N. Y., develops and tests the large ground electronics components such as the ground radars and command control links.

The Cambridge Research Center, located near Boston, Mass., carries on important research programs in geophysics and electronics.

At the Arnold Engineering Development Center, Tullahoma, Tenn., large wind tunnel facilities are being completed which will make it possible for us to get hypersonic and high-altitude aerodynamic information on full-scale airframes and engines.

The Air Force Armament Center, Eglin AFB, Fla., contributes in the areas of conventional high-explosive warhead design and ballistics.

At the Air Force Special Weapons Center, Albuquerque, N. Mex., the nuclear warheads are mated to the guided missile weapon systems.

At the Air Force Flight Test Center, Edwards AFB, Calif., answers in the area of aerodynamics are obtained through the operation of a high-speed test track. Also, we have there facilities for testing of large rocket engines up to 1,000,000 pounds thrust.

At the Air Force Personnel and Training Research Center, located at Lackland AFB, Tex., the personnel requirements for the operation of these new weapons are determined. For example, a new weapon such as the ICBM would be analyzed in terms of the types of skills that will be required to operate this weapon, and methods and techniques are developed for selecting and training people to do these new jobs.

The Holloman Air Development Center is located at Alamogordo, N. Mex. Its test range is part of the White Sands Proving Ground complex, and it gives us a short land range about 100 miles long where such missiles as the Falcon guided aircraft rocket and the Rascal air-to-surface missile are flight-tested. Also at this center we obtain many of the answers to aerodynamic problems through the launching of high-speed rocket test vehicles. And too, at Holloman, much of the geophysics work planned by the Cambridge Research Center is supported through the launching of high-altitude rockets and upper-air balloons.

At the Air Force Missile Test Center, Cocoa, Fla., we are building a long range which will extend 5,500 nautical miles across the South Atlantic. Here, longer-range missiles are undergoing flight testing. Among these are the Bomarc interceptor missile, the Matador tactical missile, and the Snark intercontinental missile.

All of these centers work together, then, as a team within the Air Research and Development Command. However, we do not work alone. As I indicated earlier, we work very closely with the Air Materiel Command, which procures these weapons after we have completed their development.

Together, we and AMC are in business to provide the operational commands such as the Strategic Air Command, the Tactical Air Command, and the Air Defense Command with the weapons which they need to do their job.

We carry on this development and production program largely with the industry and the universities and research groups of the nation. It is here, in this scientific and technical and production potential, that our future airpower is being built.

Now, for a look at the job to be done. Although you hear more about the ICBM, the responsibility of ARDC is not confined to the development of this one weapon alone, but as General Lindsay pointed out, to the development of a whole spectrum

CONTINUED

of weapons which are essential in carrying out the roles and missions of the Air Force. This family includes:

- The guided aircraft rockets which can be launched offensively from our interceptors against invading enemy targets or defensively from our own invading bombers against enemy interceptors.
- The interceptor missiles which can reach out at long range, as compared to anti-aircraft and artillery missiles, to intercept and destroy incoming enemy bombers. These are, as General Lindsay mentioned, area defense weapons as contrasted to the local defense weapons.
- The air-to-surface guided missiles which can be launched from our attacking bombers at a distance from highly defended enemy targets to deliver nuclear warheads at supersonic speeds.
- The surface-to-surface guided missile for use either in the tactical role at shorter ranges in support of the ground forces or in a strategic role at long ranges to apply airpower to the military and economic structure of an enemy.

And here, of course, there are two general categories of missiles being developed in this area. One is an airplane type of winged missile which follows a path parallel to the earth's surface and which flies within the earth's atmosphere at all times.

And the other category is the ballistic missile which is guided into space and follows a ballistic path to its target. Both of these missiles are capable of carrying thermonuclear warheads.

All of this effort, then, is directed toward giving us a versatile and more effective family of guided missile weapon systems, either in combination with manned weapon systems or complementary to them.

This, then, is the organization and the job it has to do. It serves as a prelude to a look at the more specific research and development projects which will be discussed by the speakers who follow me.—END

BRIG. GEN. DON R. OSTRANDER
General Ostrander is Assistant for Guided Missile Systems at Hq., ARDC. Born in Stockbridge, Mich., in 1914, he was graduated from the US Military Academy in 1937. During World War II he served with the Eighth Interceptor Command as an ordnance officer. He moved to AMC in 1947. In 1954 he assumed command of the Holloman Air Development Center.

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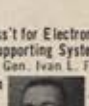

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Problems and Pitfalls in Guided Missile Research

Brig. Gen. Marvin C. Demler

DEPUTY COMMANDER FOR RESEARCH AND DEVELOPMENT, HQ., ARDC

BASIC TO progress in guided missiles is a sound program of research and development. Let us look, therefore, at some of the important technical areas.

One important area of research is that of aerodynamics. Ten years ago we were faced with overcoming the sound barrier—or flight in the speed range of 600-800 miles per hour. Today we are planning vehicles to fly at speeds several times the speed of sound, and, in the case of the intercontinental ballistic missile we estimate velocities, as it re-enters the earth's atmosphere, of over 10,000 mph. There is much which we must learn about flight at such speeds.

One tool to help us in this search is the wind tunnel. In Air Force wind tunnels, those of the NACA, and those of our contractors, we study the facts of high-speed flight. With color Schlieren motion pictures, we record the shock wave pattern and the characteristics of high-speed air flow about a specific test shape and through the analysis of these test data, obtain information for future high-speed design.

Another approach to getting aerodynamics answers is the use of research test vehicles. By mounting a test shape on the nose of such a rocket it can be employed as a free-flight research tool to gather data at hypersonic speeds.

Still another research tool is the high-speed track and rocket sled. The new Convair rocket sled was announced recently. It is propelled by twelve rockets—seven on the sled and five on a pusher sled. The pusher sled accelerates the test unit to 620 mph in 950 feet. Then the rockets on the main sled take over and with an acceleration of twenty-five Gs drive it up to speeds of over 1,500 mph—in fact, it has attained a record speed of 1,560 mph. We can mount aerodynamic shapes on such sleds. In this particular case, the sled is being used for rain erosion tests in which exposed parts of aircraft and missiles are being subjected to simulated storms simply by placing water spray nozzles along the track.

All of these tools and techniques are being employed in our concentrated attack on the basic problems of aerodynamics.

Another problem associated with high speed is that of structural materials. We speak today of the thermal barrier which faces us. This barrier might well instead be called a materials barrier. Speeds increase; the skin temperatures generated also increase.

For example, aluminum alloys, which have been the major airframe structural material for the past decade and more, can't be pushed much be-

yond Mach 1.5 at sea level where the thermal barrier begins. Titanium—heralded as a substitute for aluminum at higher temperatures—carries us to about Mach Three.

For speeds far beyond this, we are faced with the challenge of either developing new materials or alloys or getting inside the molecules of known and existing materials and rearranging the atoms to give us new metals having heat-resistant characteristics compatible with future high-speed operation.

As we succeed in developing improved heat-resistant metals, however, we create an associated development problem in that these improved materials generally are harder and will cause considerably more wear and tear on the cutting tools and dies.

With aluminum, magnesium, and titanium, for example, industry has been able to increase production while maintaining a relatively constant effort through the development of improved manufacturing techniques and automatic equipment.

With the introduction of the harder metals, however, the dies and cutting tools are subjected to more severe wear and tear. Thus, production will fall off greatly for the same amount of effort. To achieve equivalent production, a tremendous amount of additional effort will be required with current production methods. There is much research and development work to be done in this area, therefore, if we are to have the capability of mass-producing future guided missiles.

Another vital area in the building of guided missiles is propulsion—the engines to produce the power to drive these vehicles at high speeds to their targets.

In some of our guided missiles we use turbojet engines such as are used in the high-performance fighters and bombers of today. Typical of this type of engine is the Allison J-35. Turbojets can give us supersonic performance as we have seen in the Lockheed F-104, which has flown at speeds well beyond the supersonic with the J-79 engine developed by General Electric.

When we consider speeds beyond about Mach Two, however, the ramjet type of engine is of greater interest. The ramjet, which has been called a "flying stovepipe," is interesting in that it requires no rotating parts to obtain the necessary compression of air to support combustion. Through the proper design of the air inlets and diffusers, the air is slowed down and packed up in the combustion chamber to obtain the necessary compression to sustain combustion.

In our ramjet development program we have used the X-7 research vehicle as a high-speed test bed to get test and design information in actual flight. Here we see the X-7 which was developed and built by Lockheed. On it is mounted a ramjet engine developed by Marquardt.

The test vehicle is taken aloft by a B-29 and then launched. A rocket booster drives it up to the speed where the ramjet operates efficiently and takes over to accelerate the vehicle to its designed speed.

Through this research and testing program we are developing successful ramjets for operational use. Also, this supersonic vehicle is serving as a test bed for the development of other important missile components. The vehicle is recovered by parachute and will be used again for future test flights which represents quite a saving in our testing program.

Now, when we consider space flight beyond the earth's atmosphere, we turn our attention to the rocket which carries its own oxygen supply to support combustion. The rocket is also useful in launching missiles and in getting them up to flying speed where their main sustaining power systems take over, as we saw a moment ago in the case of the X-7.

There are many problems associated with the design and manufacture of these engines and the fuels they require. Considerable testing is required at our contractors' plants and in our own Air Force laboratories to insure that we have dependable systems.

We've spoken of the problems of aerodynamics, materials, and propulsion. The most critical problem is yet to be discussed—that of guidance; for it is the automatic guidance and navigation system that makes possible a *guided missile.*

Ever since prehistoric man picked up a stone and threw it at his enemy, man has wanted the capability of changing the direction or course of his missile after it is in flight so that it might strike its intended target. The developments of recent years have produced automatic flight, navigation, and control equipment for manned flight. These developments have been the springboard for missile guidance system developments. However, the guided missile imposes still more stringent requirements for complete automaticity and reliability.

The guidance system is the brain and nervous system of the missile. There are a number of different types of guidance systems being developed. Basically, we might break them down into two categories: those for use against fast-moving air targets, and those for use against fixed-surface targets.

In the case of those missiles, either ground- or air-launched, which are to be employed against air targets moving at high speeds, we are faced with the problem of detecting the air vehicles and then tracking them down to intercept and kill. There are several phenomena which we might use for the important phase of detection.

For example, we might use radar, in which case the sky is swept with electronic pulses until they strike and are reflected from the target giving range and direction information. The missile is then directed to the target on the basis of this information.

Another approach would be the use of a seeker in the interceptor weapon which is sensitive to heat, or infrared radiation. Since aircraft and missiles, particularly the engines, are strong heat sources against the cold background of the sky, they can be detected and tracked to intercept.

Still other interesting approaches which warrant investigation and development effort are the acoustic detection systems which rely on the sound made by the air vehicle, and air wake detectors which rely on the air disturbances, or wake, created by the air vehicle in its flight.

With all of these approaches, we have the problem of building small guidance systems which must be accurate and unerring. Even with the larger interceptor missile which is launched from the ground, size and weight are at a premium. Therefore, the miniaturization of components becomes quite important. But with all of this, the reliability of operation of these components must be improved.

Against fixed-surface target, the inertial guided system is of major interest. In this system, we employ a gyro-stabilized platform consisting of an intricate arrangement of gyroscopes to maintain a stable point of reference. Mounted on the stable platform are accelerometers or devices which measure the accelerations in all directions to which the missile is subjected. Through built-in computers, the distance traveled and lateral displacements from the prescribed course are determined. With this basic data, the missile guidance system continuously computes the position of the missile and sends corrective signals to the missile control system to place it on course to its target.

Since this type of system does not depend upon electronic emanations, such as radar pulses, to determine its path, it is not susceptible to enemy electronics jamming.

Now this has been a greatly over-

(Continued on following page)

simplified statement of a complex development problem, a problem which also calls for the design of components of high accuracy and reliability as well as small size and weight.

For example, the gyros in such a system are so sensitive and of such accuracy that we must produce them under hospital operating room conditions, where a speck of dust cannot be allowed and temperature and humidity conditions must be rigidly controlled.

Another type of automatic guidance system, which can be used in combination with the inertial system, is the automatic star tracker. With this system, the stars are used to calculate the position of the missile over the earth, using the same principles of celestial navigation as employed by the captains of seagoing ships for centuries past.

Here, as the missile passes along its course, successive pairs of stars are automatically picked up by the star tracker and the position of the missile is computed. Such a system must be capable of seeing and tracking the stars during the day as well as at night and must have a method of accurately determining the local vertical at all times along the path.

In all of these guidance systems, electronics plays an important part. Here are some examples of what is being done in miniaturizing electronics equipment. These results are typical of the progress which is being made in this field. This reduction in size and weight with an increase in serviceability and reliability will play an important part in giving us truly operational guided missiles of great accuracy.

Here is a portion of the thousands of parts in a typical modern missile. Each part has had its birth in research and development of the past. Each must be reliable in doing its individual job. We cannot afford to lose expensive weapons and, more valuable than that, the precious time that is critical in any future war because of the failure of one of these many pieces. This is a challenge to which our American industry has responded with commendable progress, but we still have a long way to go.

Before closing, let's look a bit into the future and consider how we can make use of one of our least exploited sources of energy—the energy of the sun. There are a number of techniques for converting solar energy to electrical power. At our Aeronautical Research Laboratory at Dayton, Ohio, we have developed this solar battery which consists of semi-conductor cells (they are cadmium-sulphide cells, in fact). With such a solar battery we are presently able to convert solar energy to electrical power. Much is yet to be done to exploit this power source.

The point we were trying to make to you was that as our guided missiles, and perhaps satellites, of the future sail through space, the energy of the sun may help get them on their way.

Before this can be possible and before many of the other capabilities which we desire in our modern weapons of the future can be possible, we must solve many difficult problems. Their solution lies in an orderly research and development approach supported by an extensive test program.—END

BRIG. GEN. MARVIN C. DEMLER

General Demler is Deputy Commander for Research and Development, ARDC. He was born in 1909, graduated from flying school in 1932, and became a test pilot in 1934. In November 1949 he moved to Wright Field and became Chief of the Power Plant Laboratory before becoming Chief of Staff, AMC. He served as Vice Commander of WADC before he was named Assistant Deputy Commander for Technical Operations at ARDC in 1954.

Test Programs—Path to Missile Pay-off

Maj. Gen. Donald N. Yates

COMMANDER, AIR FORCE MISSILE TEST CENTER, ARDC

THE PAY-OFF in research and development comes when the advanced know-how and components produced are combined into guided missile weapon systems of qualitative superiority which we will be able to operate with satisfactory reliability.

To attain this end, we must go through a comprehensive and ex-

tremely exhaustive program of testing both the individual components and sub-systems, and also the complete weapon systems. I want to emphasize particularly, at the risk of some repetition, the need for aerodynamics research facilities, rocket test stands, and rocket test ranges as specific examples of our activities in this area. These facilities are expensive; however, this expense represents an initial investment much like that which we had when we started the aircraft business decades ago. It is a cost which we must meet if we are going to have guided missiles which we need for our future defense effort.

At the North American Rocket Test Station at Santa Susanna, Calif., the engine development program, which was originally started as part of the Navaho intercontinental missile program about ten years ago, is giving products today not only for the Navaho program, but also for our ballistic missiles program and for those of the Army and Navy.

At Edwards AFB, we have similar facilities necessary to carry on this extensive program of rocket engine development and the static, or captive testing, of full-scale missiles. When we consider the launching requirements for the large intercontinental ballistic missiles and the aerodynamic missiles, the need for rockets of extremely high power becomes readily apparent. Because of the tremendous investment in these missiles, we can ill afford to have any engine failures. Facilities like these help to insure that every component and part is thoroughly tested and that we have propulsion systems with the power and the reliability to do their jobs.

Snark is actually a strategic pilotless bomber designed for long-range work.

To fill our aerodynamic problems on full-scale airframes and engines, we are now completing a well integrated complex of wind tunnel facilities at the Arnold Engineering Development Center in Tennessee. Within the next year or so, this Center will be in full operation. The engine test facility is presently in use, and we are getting information which is speeding the development of our guided missiles as well as our manned aircraft. The Army and Navy and industry will also benefit from the tests conducted in these wind tunnels. They are valuable adjuncts to our wind tunnel program.

The Air Force has two centers engaged in testing complete guided missiles. One of these is the Holloman Air Development Center at Alamogordo, N. Mex. Here on the White Sands range, we are testing short-range missiles such as the Falcon and Rascal. I will discuss these briefly later. Radar-tracking equipment and other complex instrumentation reports the data on flight performance of missiles during their development tests. Their control is accomplished from a reinforced concrete block house.

The other test range, the Air Force Missile Test Center at Patrick AFB in Florida, extends about 5,000 miles southeast over the South Atlantic ocean. This range will accommodate our longer-range missiles such as the Snark, Navaho, and other ballistic missiles. At this range we also have requirements for equipment to launch, control, track, and test the missiles in their flight. Radar, and optical and photo theodolites help us follow the missiles in flight. Test operations controlling these missiles are carried out from a room in our Central Control.

The flight test report is actually the pay-off. The process of reducing to useable form all of the data which is

(Continued on following page)

Northrop's F-89 and Hughes Falcon missile make up a deadly team. Falcon's "educated nose" packs intricate guidance system into relatively tiny space.

There is no one "cure all" for system instability. The desired stability of a servo loop is attained through the proper selection of components that satisfy the various conditions under which the loop will operate. Kearfott offers four basic motors and combinations for providing system stability. All feature high speed of response; low inertia and high stall torque.

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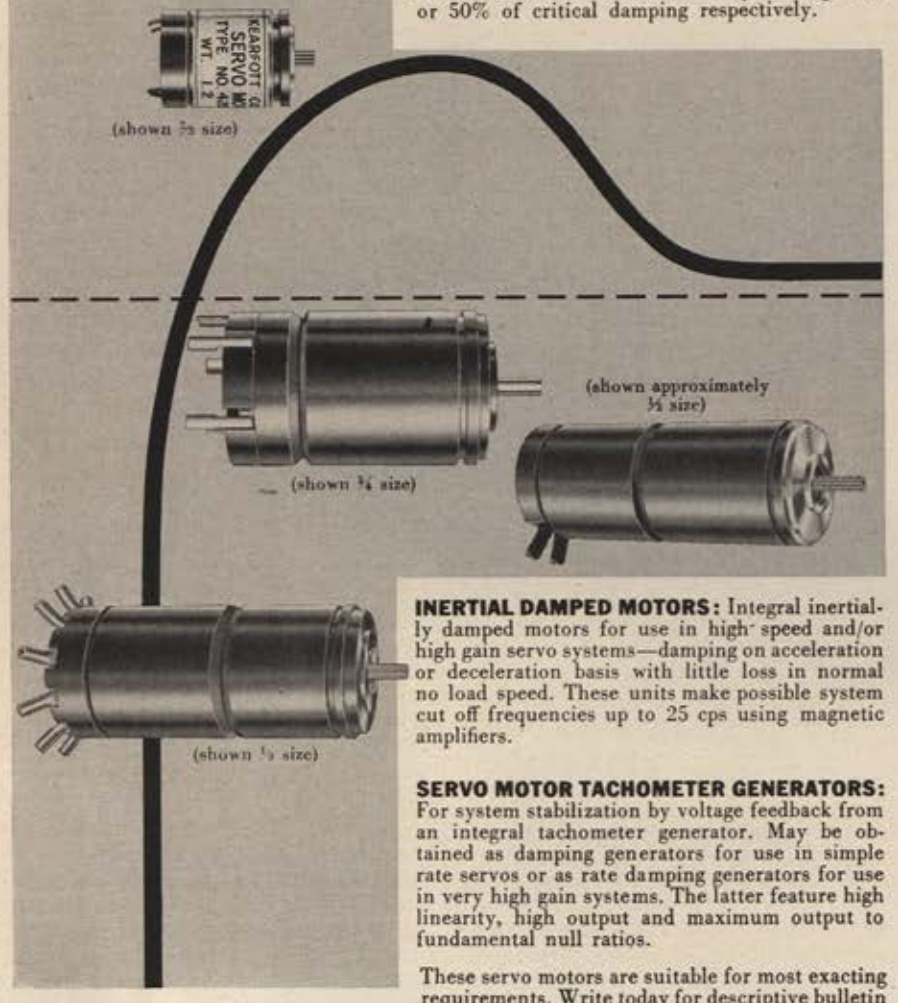
VISCOUS DAMPED SERVO MOTORS: Provide integral viscous damping for simple instrument servos. Any degree of damping can be provided. These units reduce no load speed of standard motors to 50% or 75% of normal, providing 70% or 50% of critical damping respectively.



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telemetered to the ground stations by the missile is, therefore, an extremely important operation. It is a time-consuming and extremely tedious process.

Magnetic tape recorders receive and store test information from the telemeter senders sent by the missile in flight. Through electrical means the information is translated into a more useable form. IBM equipment is particularly useful in sorting out the facts from these recorded data and putting them into shape for analysis.

The human input in plotting and reducing this data is, of course, vital in interpreting the results of the flight test. From the mass of data recorded and presented to them, the engineers make their analyses and fixes are established for future flights.

Now, to the missiles—for air defense, we have the Falcon which has already been mentioned. A guided aircraft rocket, built by Hughes Aircraft Company, it is small enough to be carried in quantity by an interceptor. This six-foot-long missile which is six inches in diameter has certainly proved that it has an educated nose enabling it to perform a flight that is very, very deadly.

Another important air defense weapon system is the Bomarc. This missile is an area defense weapon considerably longer in range than the present missiles in operational use. It is rocket-boosted for take-off and has the ramjet for propulsion.

In operation, these missiles will be dispersed to provide a solid coverage over vital defense areas in which a number of important military installations, industrial complexes, and population centers are located.

An interceptor missile is the Talos. This has been mentioned as having been developed by the Navy. It is being adapted for operational use by the Air Force and will become part of our air defense system in the future. It is a medium-range interceptor missile for extremely high speeds.

In connection with this flight testing program, target drones are essential. We have taken many of the B-17s which served so well in World War II and have had them converted to target drones for use as targets for our guided aircraft rockets and our interceptor missile programs.

Another approach has been to build special drones or target aircraft such as the Q-2 Firebee, built by Ryan Aeronautical Company. The small size and high speed of this particular vehicle simulates quite accurately the components of altitude and speed of enemy aircraft. This may be launched

(Continued on following page)

either from the air or the ground, and it has proven extremely economical with its relatively cheap manufacturing cost and its extremely effective aircraft parachute recoverage system.

In the area of tactical air operations the TM-61A Matador with which you are most familiar, I'm sure, was developed by Martin and is already operationally deployed in Europe. The Matador's launching platform is actually its transportation trailer, doubling in brass. A large solid component booster rocket gets it into the air. Propulsion to the target is provided by an Allison J-33 engine and control is electronic. It carries either conventional and nuclear warheads.

On strategic air operations, we have the Snark, or SM-62. This particular vehicle is a semi-tailless pilotless aircraft. Like the Matador, it is launched from a zero-length launcher. However, due to its much larger size and weight, it requires two canted nozzle booster rockets for take-off. In flight it is powered by the J-57 engine and guidance is completely self-contained and fully automatic. This will also carry either the atomic or thermonuclear warhead when the range is not over 5,000 miles.

The Rascal missile which has been previously mentioned, is being developed by the Bell Aircraft Corporation. This rocket-powered missile will be operated in combination with manned bombers as an aid in penetrating enemy defenses. It is fired from the bomber at very high speed to knock out vital targets far in advance of the bomber. Like all other strategic weapons, it carries nuclear warheads.

Another major program in the field of strategic missiles is the Navaho, or SM-64, being developed by North American. In order to get the flight data and know-how to complete the operational design of the Navaho, a flight-test program is in progress at Patrick AFB at the present time. A test vehicle [designated the X-10] is powered in this particular test program by two turbojet engines and it has flown at high supersonic speeds. The primary purpose of the test flights was to prove out the advanced aerodynamics design and, in addition, we are gathering information on the electronics systems and the general flight characteristics of this test. From the flight-test program, we hope very soon to launch into the final Navaho guided missile.

This has been a fast dash over a tremendous effort. I hope I have been able to leave with you a little bit of the tremendous potential in the Air Force weapon systems of the future. The cost of reducing these weapon systems to a status where they can be handled through operational units in a fully operational and reliable fashion is tremendously impressive; the cost is high.

However, in terms of national defense, I don't feel that there is any other way that we can better spend our dollars.—END

General Yates is Commander of the AF Missile Test Center, ARDC. Born in 1909, he's a 1931 West Point graduate and earned his wings in 1932. A graduate meteorologist, he became Air Weather Service commander in 1945. In April 1951 he became Director of Research and Development, Headquarters, USAF. He moved to his present position in 1954.

Who Is Doing What in Ballistic Missile Research?

Brig. Gen. Donald R. Ostrander

ASSISTANT FOR GUIDED MISSILES SYSTEM, HQ., ARDC

THE NEXT logical progression in the family of weapons discussed by General Yates is the ballistic missile, a weapon of tremendous potential in our future arsenal of airpower.

As I pointed out earlier in this briefing, the job of developing and producing the ballistic missile is the responsibility of the Western Development Division of the Air Research

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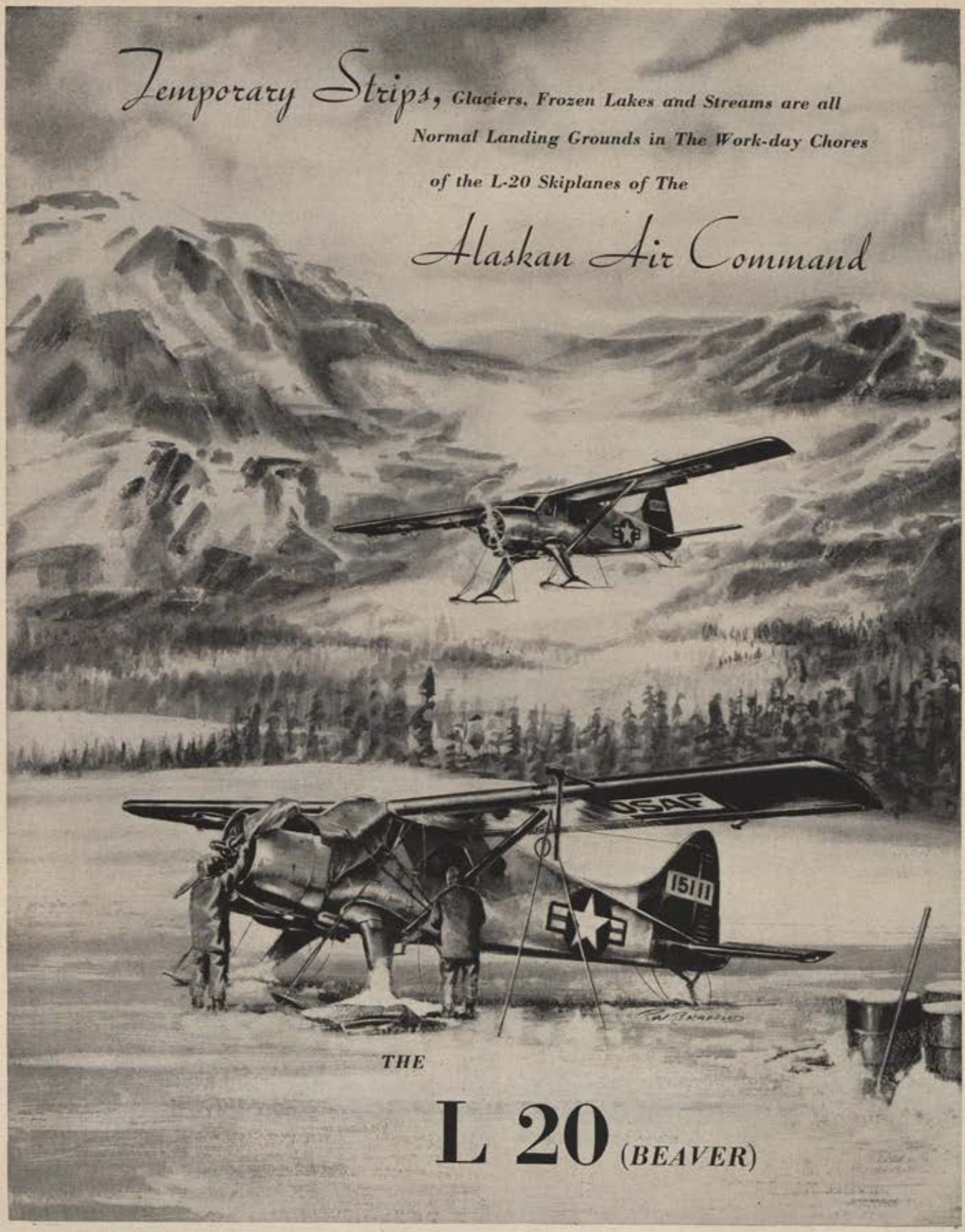

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and Development Command. In addition, they also have the responsibility of developing an initial operational capability which will make it possible for us to employ the weapon when it becomes available.

Before discussing the development program, let us review just what a ballistic missile is and the concept of its operation so that we'll all have a common understanding.

A ballistic missile, whether an intercontinental ballistic missile (ICBM), or an intermediate range ballistic missile (IRBM), is composed of four basic sub-systems:

- The nose cone which houses the nuclear warhead.
- The guidance system which puts it on the right path to the target.
- The airframe which forms the missile body and which contains the various sub-systems as well as the fuel for propulsion.
- The propulsion system which provides the power to drive the missile into space.

In each of these areas we have subsystem development problems as were discussed earlier by General Demler. These problems are being resolved. A successful operational weapon is within the known state-of-the-art—by that I mean that there are no major scientific breakthroughs necessary to successfully build and launch a long-range ballistic missile of the type we are developing; however, I hasten to add that many refinements and improvements are still needed to further the present technology. We are confident that these challenging problems can be solved.

And now let us take a look at a typical flight profile of a ballistic missile. In principle, a ballistic missile is aimed from its firing point and after its rockets are expended, follows a ballistic flight path to its target. Once the missile is out of the earth's atmosphere only token power is needed to carry it great distances. The problem then is to get the missile out of the earth's atmosphere as fast as possible, then lighten the load by dropping off the expended engines. The missile will then literally coast to its target. As it begins to fall back into the atmosphere, the second major problem, that of re-entry into the earth's atmosphere, arises. During re-entry the missile, which is traveling at speeds of over 10,000 miles per hour, becomes a man-made meteor; however, few meteors ever reach the earth since they burn up from the heat generated by the friction of the earth's atmosphere. This heat problem is among the most important of the technical problems which we must solve in producing an operational ballistic missile.

As you can well realize, a missile with the capability of leaving the earth's atmosphere at meteoric speeds, and accurately striking a relatively small target at its destination, requires exacting calculations as to range, speed, and location of the target in order to successfully complete its mission.

To make certain that our aim is good, the guidance system checks on these calculations for a short time during the initial stages of the missile's flight and makes minor corrections when necessary. From then on a missile is pretty much on its own and follows an unguided or ballistic trajectory to a target.

With that background of how a ballistic missile is comprised and how it will operate, let us review for a few moments the salient background events leading to the establishment of the Air Force ballistic missile program.

Nineteen hundred forty-two was a significant year in the development of ballistic missiles—in that year the German V-2 was successfully flight-tested. Between 1944 and 1945 the Germans produced approximately 6,000 V-2s of which approximately 3,600 were launched at allied targets.

In the post-World War II development program, the Air Force initiated a ballistic missile program with Convair. This was called Project MX-774. From this program came some very valuable information concerning stabilization, guidance, and powerplants. But because of economy reasons, this program had to be canceled in 1947.

Interest in the ballistic missile continued, however, both on the part of Convair and the Air Force, and in 1951 the Air Force initiated a second contract with Convair which led to the establishment of the Atlas program.

Perhaps the most significant event relating to the present ballistic missile development program occurred with the now well-known "Thermonuclear Breakthrough" in the period 1952-53. The "Thermonuclear Breakthrough" gave us the possibility of achieving higher yields from smaller warheads. With the knowledge of this technological breakthrough a group of the nation's top scientists was formed in 1953 to evaluate the long-range strategic missile development programs and to make recommendations. In February of 1954 this group recommended the acceleration of the intercontinental ballistic missile program and urged the full exploitation of further warhead developments and the creation of a development-management group composed of the best scientists and engineers available, to drive this program ahead at the fastest possible speed.

This committee was headed by Professor John von Neumann, one of the country's outstanding scientists, and the former Assistant Secretary of the Air Force, Trevor Gardner. Its recommendations were accepted, the program was assigned the highest priority in the Air Force, and the Air Research and Development Command established a field office with special authority to supervise and direct the program. This office is the Western Development Division. Its Commander, General Schriever, was assigned immediate responsibility for all aspects of the program.

I would like now to discuss in a little more detail the organizational structure of the Western Development Division. It actually consists of three elements which work together as an integrated team. The Western Development Division as a field office of Hq., ARDC directs the entire program. The Ballistic Missile Office is the AMC office which does all of the contracting work for the program. Ramo-Wooldridge—more specifically their Guided Missiles Research Division—has the systems engineering responsibility and provides technical direction for all of the contractors in the program.

In addition to this organization the Western Development Division has at its disposal the facilities and services of all of the ARDC Centers which were discussed earlier. Each of these Centers has an active part in this program.

To complete the over-all team we have the industrial organizations which will develop and produce these future weapons. The contractors who are engaged in this program were determined by selective competition. We feel that we have assembled the strongest industrial team possible. Our philosophy in the program has been competition in two senses: competition among contractors and competitive technical approaches. We feel that this will get us successful weapons sooner, better, and cheaper and also will provide us with a technical back-up. Our multiple design approach calls for two contractors in each sub-system area, except for guidance in which there are several.

(Continued on following page)

Eger V. Murphree
Defense missile chief

Trevor Gardner
One of the early pushers

This approach enables us to conduct simultaneous development of two operational missiles using entirely different technical approaches—thus enhancing our chances for early success.

Now I would like to review our principal industrial associates in this program and to indicate to you some of the progress they are making in their particular areas of endeavor.

The major *Nose Cone* contractors are the General Electric Company, located in Schenectady, N. Y., and AVCO at Stratford, Conn. A supporting Nose Cone research program is under contract with Lockheed Aircraft of Burbank, Calif.

Because of the extremes in speed and altitude required by ballistic missiles, extremes in heat must be overcome. Now, along the lines of General Demler's remarks, both General Electric and AVCO are conducting extensive studies on the effects of heat. Materials testing is a continuing project. . . . Samples of various metals and materials are subjected to intense heating to determine their capabilities. Special rocket test vehicles are used to validate research data on heating and other problem areas encountered as a vehicle re-enters the earth's atmosphere.

Ballistic missile *Guidance* contractors include the General Electric Company at Syracuse, N. Y.; the Bell Telephone Laboratories at Whippany, N. J.; American Bosch Arma of Garden City, N. Y.; and the A. C. Spark Plug Company of Milwaukee, Wis.; as well as The Burroughs Corporation at its Paoli, Penna., facilities; and the Remington Rand Univac Division at St. Paul, Minn.

Guidance contractors have been able to translate electronic research and development in other fields to the special requirements of the ballistic missile program. Use of miniaturized elements and components; design studies by the use of digital and analog computers; and materials testing and production techniques have been rechanneled to ballistic program requirements. Unique program needs, such as the ability of small elements to withstand virtually unknown stresses and varied environmental conditions are being met in the many guidance research laboratories.

The *Airframe* contractors have been previously announced by Air Force Secretary Quarles. The Atlas airframe is being developed by Convair in San Diego; the Titan airframe is under the cognizance of Martin at Denver; and the airframe contractor for the intermediate range ballistic missile Thor is the Douglas Aircraft Company, located in Santa Monica, Calif.

Ballistic missile *Propulsion* contractors include North American Aviation's Rocketdyne facility at Canoga Park, Calif., and the propulsion facilities of Aerojet-General Corporation at Sacramento, Calif. American Machine & Foundry Company is developing auxiliary power units for the program in its California facilities.

In order to adequately test rocket engines of the size and power required to propel missiles great distances at tremendous speeds, a test program of unusual proportions had to be initiated. One of the factors that had to be considered in the design and location of our test facilities was the high noise level of the engines during test runs; another factor was a need for close security control. Still another was the ever-present element of danger, and the knowledge that individual test facilities might be destroyed. This last element was graphically illustrated during a recent engine test run. Many of these special stands have been designed to withstand engine runs of up to a million pounds thrust.

If to this list of our contractors, you add the many participating Air Research and Development Command Centers and other governmental agencies, plus a host of associate and subcontractors, it will give you an idea of the national scope and magnitude of the Air Force ballistic missile effort.

As I mentioned in the earlier part of our briefing, there are two special Ballistic Missile Committees, one headed by Eger V. Murphree, Special Assistant to the Secretary of Defense for Guided Missiles; and the other an Air Force Committee, headed by Donald A. Quarles, Secretary of the Air Force. These committees have responsibility for exercising over-all policy supervision of ballistic missile programs; and they have the further responsibility of assuring that everything possible is done to obtain maximum rate of progress. This top-level backing has freed the program from the normal routine channels that have a tendency to slow up the development of programs with a lower priority.

As a matter of fact, the present progress of our ballistic missile program encourages us to look beyond the research and development stage. As I indicated, the mission of the Western Development Division of the ARDC is not only to develop, but to produce and initially operate the ICBM and IRBM. This is an unusual and challenging task. Normally, development, production, and operation of a new weapon system involves three separate and distinct steps with responsibility vested in three different major commands, one for each step. However, in the case of the ballistic missile all of these responsibilities remain right in the unique Western Development Division organization. Development and fabrication are being accomplished simultaneously and we are presently planning for and looking forward to the forthcoming operational phase.

The organization, development, management, and fabrication of the weapons have been carefully worked out to provide a rapid transition from initial hardware to a truly operational weapon so that no time is lost in pro-

(Continued on page 124)

s'Gravesande's Stoomwagen

s'Gravesande's Steam Reaction Car

In 1721 Jacob Willem s'Gravesande of Delft, stimulated by the recently enunciated Third Law of Motion, astounded the Royal Society by constructing a practical steam reaction car. The vehicle actually moved several times its own length, a distance of about two meters.

In 1956 the goal is no longer meters, but hundreds, and even thousands, of miles. Aerojet-General Corporation, leader in American rocket propulsion for more than a decade, is proud to participate in man's first assault on the frontiers of outer space—Project Vanguard.

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viding the Strategic Air Command with a reliable ballistic missile force which will augment and complement our existing potent deterrent force of manned bombers.

In summary, then, we have drawn in very broad outline this morning, a picture of the Air Force research and development program for guided missiles. Very obviously, the restrictions of security have made it impossible for us to present in detail all of the interesting and important facets of this program. We hope that we have succeeded, however, in bringing home to you these points:

First, that the Air Force guided missile development program is one which is based on many years of forward thinking and sound planning.

Second, that while guided missiles offer thermonuclear operational potentialities they will not preclude the use of research weapon systems which may be able to do certain jobs more effectively.

Third, the basis for the successful output of guided missiles is a sound program of research and development to advance the state-of-the-art in the various technical fields such as aerodynamics, propulsion, and electronics.

Finally, that an important investment in test facilities and test equipment is required to make possible these future weapons—weapons which are essential to shaping qualitatively superior airpower of tomorrow.—END

BRIG. GEN. DON R. OSTRANDER

This paper was originally prepared for delivery by Maj. Gen. Bernard A. Schriever. In General Schriever's absence the paper was presented by Brig. Gen. Don R. Ostrander, Assistant for Guided Missile Systems at Hq., ARDC. Born in Stockbridge, Mich., in 1914, he was graduated from the US Military Academy in 1937. During World War II he served with the Eighth Interceptor Command as an ordnance officer. He moved to AMC in 1947 and became Special Assistant to the CG of ARDC, stationed at Wright-Patterson AFB. In 1954 he assumed command of Holloman Air Development Center. *See page 107 for the other presentation by General Ostrander.*

Martin Matador was first pilotless aircraft to become actually operational. This one stands poised in Germany.

QUESTIONS

Henry Simmons; of *American Aviation*: During this presentation nothing was said about the program of counter-ballistic missiles. I wonder if someone could address himself to that subject.

General Power: Obviously, we are getting into an area of closed security. I can tell you this though: that we have taken cognizance of the area. There is a requirement for anti-ICBM. We have an organization, management organization, that we believe has progressed well into the program.

Moderator Walkowicz: Try to read between the lines of that! I looked around the audience to see if Trevor Gardner was here, but I see he is not. Are there any further questions?

Victor Modena: I have a question for the panel. In your opinion, do present lubrication limitations prevent greater accuracy of guided missiles by requiring comparatively large clearances between the moving parts of its guidance mechanism; and would not a major advance in lubrication be of some possible service in this area?

General Demler: The problems of lubrication with existing petroleum products for our present weapon systems, both missile and aircraft, are satisfactory, but as we try to point out in the higher speed regions we get into higher temperatures where our existing lubricants tend to break down. So we're going to have to, in answer to your question, say yes, solve that problem by approved new lubricant materials.

How Missiles Are Phased Into Air Force Operations

Maj. Gen. Kenneth P. Bergquist

DIRECTOR OF OPERATIONS, DCS/OPERATIONS, HQ., USAF

YOU HAVE been told the position of the Air Force with regard to our national policy, and the impact of the guided missiles program on the Air Force role and Air Force personnel. Also, you have had explained the research and development activities of the Air Force and the approach being followed in this phase for missiles.

During the next few minutes I shall make remarks on the deployment of missiles, their introduction into combat units and the continuing requirement for operational testing of missile units.

Long-range missiles of the intercontinental type will be deployed within the ZI on the concept of being widely dispersed. Medium-range guided missiles will be strategically located in such a manner as to insure maximum target coverage and minimum vulnerability. Tactical missiles have mobility and will be deployed with tactical air forces as needed on a global basis. Such deployment of offensive missiles can provide coverage of all appropriate missile targets under general or limited war conditions.

On the defensive side, air defense in depth will be provided by surface-to-air missiles and air-to-air missiles. Building outwards from the point or complex to be defended we have the Army's Nike; next can be the Talos, then the longer-range Bomarc, and beyond we will have far-reaching general area coverage by manned interceptors carrying air-to-air missiles. This order of deployment is based on range capability or area that can be covered. All can be operated by the SAGE system as a family of weapons. Missiles are required for air defenses whether they be launched from the ground or launched from the air. But no one type can do the whole job—an integrated family of missiles is required.

General Lindsay pointed out the somewhat conflicting requirements of maintaining an effective force in being and of modernizing the force with new weapons. The second of the three guiding principles he enunciated, is basic to the remainder of my remarks and I quote:

"After we have activated initial guided missile organizations, we will conduct operational exercises to determine data on characteristics, capabilities, and limitations. Thus, we can evaluate guided missile units in relation to manned aircraft units. This evaluation, based on combat effectiveness, will determine a replacement factor and a relative combat value. Until this evaluation is completed, the manned force must be maintained as the force in being." I will elaborate on the "operational exercises" he referred to.

In designing, developing, and testing missiles, we follow a logical sequence of events which ultimately leads to operational utilization, or to discard in case of unacceptable performance. During this development period, as stated in the ARDC presentations, checks and tests are continually run on the components and subsystems, always leading to improvement modifications of the original models. At completion of the first prototype, tests are made to evaluate the functional reliability of the components within the environment of the complex vehicle itself.

This cycle may be repeated many times—as often, in fact, as necessary to produce a fully proven missile—proven in the sense that it functions within research and test surround-

(Continued on following page)

ings. At this stage, organizational units are established, individuals trained, and the first production items begin to come off the line.

All of this is preliminary to the conduct of operational exercises. We must now determine the effectiveness of the missile, as an advanced weapon system, when removed from the area of controlled tests and applied to the more rugged operational environment. Many important questions are yet to be answered. We need to ascertain such factors as over-all reliability, system accuracy, and reaction time; we must acquire precise data as to the relationship of the launching site to the target and the flexibility of the missile's employment within an area and within an organizational structure. We must refine continuously, organizational structures and manpower and logistic requirements. In other words, we face the problem of gaining operational knowledge and confidence in the missile itself, and at the same time, of eliminating weaknesses in the missile system. This problem will be with us continuously.

Consider the Matador, the first guided missile introduced into our tactical theater air forces. It has been undergoing operational evaluation for some time. Through a series of tactical exercises, we have gained much knowledge and experience – information which will, in large measure, be applicable to any missile system. The most recent operation, conducted in an overseas area, demonstrated conclusively that reliability and accuracy for the system was on a par with that obtained with our inventory fighter-bombers. These exercises became the basis for developing factors of operational confidence and standards of reliability upon which the commander can plan employment. Further, they led to modifications which improved the accuracy of the Matador, and they furnished invaluable training and experience for the unit personnel. As a logical outgrowth of these flights, increased interest, increased morale, and a greater capability have become apparent.

As you know, any new equipment presents numerous problems, which result in modifications of the equipment itself and perhaps even a revised approach to the tactics of employment. A prime example is the B-47, present backbone of the Strategic Air Command. This remarkably efficient aircraft has been in our inventory for approximately six years. Before it went into full production, it underwent innumerable tests. Yet during the relatively short period in which it has been employed, it has been subject to upward of three thousand modifications! These range from replacement of a cotter key with a bolt – to something as major as a change of fuselage configuration – lengthening it over-all by about two and one-half feet. All of the various modifications resulted in more fuel economy, greater range, more combat effectiveness, improved operating and maintenance procedures, and in some instances better crew comfort. With missiles, we can expect similar operational modifications. For example, we may find it essential to have built into the weapon system an additional component which will insure lock-on with the guidance signals sooner than is presently possible. Equally feasible, we may find that variations in the protective shields at launching sites will boost the take-off power, or eliminate a certain amount of vertical instability, or result in greater launch crew safety.

Unlike present experience with manned aircraft, we have less history to lean on; and, therefore, the problems of anticipating the types of operational or maintenance factors are more elusive. Our existing missile units are pioneers, so to speak, working in an uncharted realm of activity; and we are constantly learning—much as did the aviation vanguard in the early 1900s. Further, we fully realize that operational development will continue as long as this system is with us; it occurs in the form of continuous changes to equipment, to organizations, and even to the concept of use.

With regard to personnel training as well as the operational development, it would be most desirable to conduct continuous exercise firings at each actual operational launch site in order that crews, guidance equipment, and facilities be evaluated and properly integrated at the operating location. However, the hazards connected with booster fall-out and the flight of unmanned vehicles over or near populated areas prohibits this line of approach. This being the case, periodic firings are being conducted at selected bases, utilizing over-water ranges and isolated impact areas. Although this method of using simulated or similar conditions does not afford us the *exact* data we desire, we can get an approximation of our effectiveness. "Live" firings are essential to adequate crew training and, to prove out the system, such firings must be conducted in an environment that approximates as closely as possible the actual operational locale and conditions.

As I stated earlier, we have modified the Matador and adapted new techniques, until the system capabilities are on a par with fighter-bomber aircraft. The three Matador units overseas attest to the fact that this weapon system effectively complements our manned tactical air forces in forward areas.

In the foreseeable future, as General Lindsay told you, missiles will not completely replace manned aircraft. Replacement will follow a requirement patterned upon doing the same job for less cost or doing a superior job at the same cost. To realize either of these potential goals, complete and continuing analysis of all factors must be made.

The experience that we have gained from the Matador system has been related to our newer missiles and will prove invaluable in reducing the time required to gain true operational capability with them. In all cases we will continuously exercise missile units as they become operational. We believe that an approach of this type, although initially appearing to be quite costly, will do three things:

1. Give us earlier combat readiness;
2. Improve the missile systems;
3. Save us money in the long run.

Gentlemen, as you have heard here this morning, guided missiles are here. They are moving into the status of being the deterrent "big stick" of airpower. If you prefer to call it the "push button" era, we are close to it, but I am sure you now agree that it is a bit more complicated than button-pushing implies. The Air Force is ready, willing and able to get on with the job, but to be successful it must have the continual and increasing assistance and support of the integrated effort epitomized in the Air Force Association.—END

MAJ. GEN. KENNETH P. BERGQUIST

General Bergquist is Director of Operations, DCS/Operations, Hq., USAF. He was born in 1912 and graduated from the US Military Academy in 1935. Before World War II he was stationed at various bases in the US and Hawaii and served in the South Pacific during the war. In 1947 he went to Athens, Greece, as the Military Air Attaché. He graduated from the National War College in 1950 and the following year went to ADC as Director of Plans and Requirements, then became Deputy Chief of Staff for Operations.

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Logistics and the Technological Race

Gen. Edwin W. Rawlings
COMMANDER, AIR MATERIEL COMMAND

WE, IN the Air Materiel Command, do welcome this opportunity to participate in the program of the Air Force Association. It is certainly important that you who provide such excellent support to the Air Force be kept up to date on the role that the logistic system will play in support of our combat forces.

In a very true sense, the meeting today could be compared with an annual board of directors' meeting of a great corporation. All of us here, representatives from industry, individual citizens, and members of the Air Force, are bonded together in a great team dedicated to the air defense of this country.

The logistic base of this country's air strength is inseparably composed of the skills of its individual citizens, the capability of its industry, and the competence of the military logistic organization that transmutes those capabilities into ready combat strength.

Upon you lies the continuing burden of providing the industrial resources and skills that will provide us an Air Force second to none in the world.

Today I report to you fellow board members on air logistics in total war. Two of the key members of my command logistic team will help me with my report. Maj. Gen. William O. Senter, Commander of the Oklahoma City Air Materiel Area, will discuss the role of his command, and Lt. Col. E. F. O'Connor, who heads the B-52 weapon system project office at my headquarters, will explain the type of management we employ for our weapons.

To place our mission in its proper perspective, let us look at a world map and the organization that will accomplish the procurement, supply, and maintenance functions of the Air Force.

The Air Materiel Command, with headquarters at Dayton, consists of eight Air Materiel Areas and seven specialized depots in the United States. Since my report to you at last year's convention, AMC has assumed command of the logistic forces in the Far East and Europe. Five overseas Air Materiel Areas now operate under our intermediate headquarters at Tachikawa in Japan and Wiesbaden in Germany. *[See Photochart, page 132].*

With this world-wide scope AMC can effectively support our fighting units around the globe in a single logistics system. Now the combat forces will have only a single system of logistics with which to deal, rather than the several systems that existed under the previous command arrangement—a great forward step in the development of logistics, a break with the past.

Ours is a technological race with our potential enemies. The most advanced-design aircraft in the world are worthless—unless they are ready to be used when they are needed. Our command has one reason for its existence—that is to provide the best possible logistic support for our combat forces within the resources available. We cannot do this job alone. It requires a tightly knit team of the Air Materiel Command, the Air Research and Development Command, and the combat forces, with industry's cooperation.

What is the team's role in this race we cannot afford to lose?

Basically, it consists of two parts, producing new aerial weapons and supporting them while they are in service. The development of these weapons is an ARDC-industry responsibility primarily, working from initial requirements determined by the combat commands. Then industry, with AMC monitoring procurement and production, must step in to engineer and shepherd the new weapon from the drawing board through the production line. When the aircraft and the missile are in production and tactical use, we in the Air Materiel Command have already rolled up our sleeves and taken over the job of supporting the plane for the rest of its useful life. Eventually we dispose of the weapon when it has no further use.

It seems to us the winner of this technological race will be the one who makes the best possible use of resources at his disposal. If we were in a short sprint, all of our resources would be available in maximum quantities. But we are in a race that stretches far beyond the horizon. The finish tape is nowhere in sight. This nation, no doubt, faces dangers for tomorrow that are yet to be counted. That is why it is imperative that we set a steady pace for the long

pull. We must be ready today, tomorrow, and the day after that.

In our command, we have geared our plans to the approved concept that the decisive phase of war, if one should start, will be fought and decided in the first thirty to sixty days. I am not saying that the war will be fought to the end within two months, but we certainly believe its decisive phase will be over by that time. For all practical purposes, this means that the Air Force probably will have to fight with the equipment that is ready to go when the bell rings.

Practically speaking, it also means that only those combat-ready aircraft and weapons in the hands of our fighting forces, or that can be put in commission during the first few days, will be committed during the decisive phase of the war. Logistically, this concept also dictates that all combat forces must have sufficient materiel immediately available to them to sustain them during the decisive phase. In this age of supersonic speeds and devastating weapons, we cannot rely upon rear area build-ups cushioned by comfortable margins of either time or distance. There will be no rear area. The front will be where our aerial weapons strike, and wherever the enemy may decide to strike back.

Resources must be conserved if we are to sustain a ready striking force for the indefinite duration of the cold war. I think the industry and the Air Force are keenly aware of the shortage of technical and engineering personnel available today. The demand for these skills will undoubtedly increase as we progress to higher levels of technology.

Limitations on our resources determine the amount and type of facilities that we can construct. These resources must be apportioned to the programs that will provide us the maximum amount of protection.

It seems to me these limitations bring out one inescapable conclusion. If we are to win the race, effective management is the key to success. Management must be dynamic, aggressive, and responsible. Management must consider the use of our resources in the light of our limitations. We will be certain losers if we stockpile large quantities of antiquated equipment. Therefore we must concentrate great effort on improved requirements. Modern technology, fortunately, in the form of electronic data-processing equipment is helping us do this job.

The Air Materiel Command has already passed the two-year mark in a five-year program designed to phase this equipment into the existing logistic system. We have some great expectations for electronic computers. We believe that they are opening the way to faster, more flexible, and more economical support of our air defense. The computers can help to give us for the first time a logistic system sharply responsive to the requirements of world-wide, supersonic airpower.

Logistics must be responsive because D-Day can be tomorrow. The basic principle of Air Materiel Command support of all combat units is concentration of effort today for D-Day tomorrow. This principle also demands that we have immediate and continuing support following D-Day. All of our procurement, supply, and maintenance actions are constantly revised to be geared to the latest wartime concepts and plans. No procedure or regulation is acceptable in the command unless it meets this wartime requirement.

The development of practical atomic and thermonuclear weapons, high-speed jet aircraft, and guided missiles have imposed upon us a problem requiring reflex logistics. Our support must be as quick as the interplay of impulse and response between nerve and muscle. To be effective, our logistic reaction time must be measured in hours rather than weeks and months. Accordingly, I committed the

Generals Senter and Rawlings of AMC flank Steve Leo, AFA Director who moderated the Combat Logistics Conference.

Air Materiel Command to the concept of D-Day readiness well over two years ago, and we have worked toward this end since that time.

Industry must also be ready for D-Day. The war support functions are being extended to these partners. Industrial compressibility, industrial acceleration, and product reliability are terms now familiar to these members of the race team.

The Air Materiel Command, in preparation for D-Day, has several specialized and important responsibilities that bear directly on the security and readiness of this country. These responsibilities are little known elements of the AMC mission.

In case of enemy attack, readiness implies not only combat capability to contain the attack and mount a counter-attack, but very importantly, the capability of early warning that the attack is on its way. The advance warning capability of the Air Force is being developed by the construction of electronic systems such as the DEW Line, Mid-Canada Line, Pinetree, White Alice System, and Texas Tower offshore installations. The nerve center for all of this defense network is the SAGE system which provides semi-automatic air defense for the United States itself.

AMC serves as executive agent in combined operations with other commands in the development of this advanced warning system. Our tasks range from maintaining liaison with the Canadian government to supervising contract performance.

In the increasingly important field of ballistic missiles, we perform production and contractural functions plus the monitoring of timely integration of the complete weapon system.

Air Materiel Command has responsibility for computing requirements, budgeting and funding Air Force ammunition programs, and, in overseas areas specifically, has the responsibility for receipt and storage of ammunition for issue to the using combat commands in the case of conventional bombs.

The best efforts of American industry go into the combat aircraft that we procure and support. In combat readiness, the full utilization of those efforts can be no better than the ultimate "pay-off" carried in the bomb bays.

We insure that these aircraft are supplied with appropriate and effective ammunition for their mission, including the latest and most potent atomic and hydrogen

(Continued on page 134)

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Jerome J. O'Donovan
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49 **Transportation Division**
Col.
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50 **Air Force Services Division**
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56 **Civilian Personnel Division**
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61 **Deputy**
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62 **Reports Control Office**
Mr. Orris O. Trinkle
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Lt. Col.
James E. Barton
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An AIR FORCE Magazine Photochart

REVISED AS OF AUGUST 15, 1956

weapons. We have developed special weapons of logistic capabilties, both organizational and procedural, to administer the important and complex task of ready supply of all types of weapons to the combat commands.

We put such a premium on this "pay-off" that we have actually integrated operational military organizations and separate staff offices responsible for ready supply of special weapons into the AMC structure.

Preparation for D-Day is the overriding consideration for all plans within my command. We work continually to keep our plans current. We publish and exercise an Air Materiel Command War Capabilities Plan which outlines the wartime tasks and responsibilities of each Materiel Area and Depot Commander in support of the combat forces. This document is reviewed and tested by the Strategic, Tactical, and Air Defense Commands, plus the Military Air Transport Service, to determine the adequacy of the planned wartime logistic support.

A priority system has been developed to insure that immediately required actions are taken first, with those of lesser importance following later. The priority system is comprehensive and includes every aspect of our operations. In the supply field, a priority system that really responds to combat needs is functioning today.

In preparing for D-Day we are working diligently to acquire airlift responsive to our needs. The rapid movement of supplies will reduce our inventory because fewer items will be needed to keep the pipeline full. The requirement for quick transportation of cargo is apparent in a modern war. Supply and maintenance actions must be completed in a matter of hours and not weeks. Of the 200 most critical items causing Air Force fighter maintenance problems, ninety percent are small enough to be carried in the rear cockpit of a T-33 aircraft. A fast, flexible intra-command materiel airlift system is now in being in ADC using T-33s to shorten transportation time, thereby reducing the out-of-commission aircraft rate and improving the air defense capability of the Air Force.

Airlift for the combat forces must be used to transport materiel requirements, both large and small; we must get our supplies direct to combat units, wherever they want them, in hours—not in weeks. We now have in being a logistic airlift system, but the Air Materiel Command does not have available to it the total airlift capability that we will need on D-Day for the adequate support of our combat forces.

Communications now link our logistic system worldwide for rapid-fire supply service. A transceiver network is tying the system together so that we know the requirements of the combat forces immediately, be the requirement at Wiesbaden, Tachikawa, or any other point.

We must be ready if war starts at noon tomorrow. It could begin at six o'clock tonight. Industry, as well as the Air Force, must live with this concept and direct their actions to preparing for D-Day. In this technological race only the winner collects. Bets are not paid for "place" or "show."

In the event of a disruption of communications the operational organizations of the Air Materiel Command must continue to function. We have delegated authority and decentralized operations to assure self-sufficiency of each Air Materiel Area and Depot and the Overseas Air Materiel Areas to carry out their mission during the initial phase of war and to act in emergencies without awaiting direction from our headquarters. The weapons with which we will fight are managed during their development and production stages by my headquarters, and the Air Research and Development Command. The Air Materiel Area Commander participates in these early stages of management because he is to become the "chairman of the board" at a later date.—END

GEN. EDWIN W. RAWLINGS

General Rawlings has been AMC Commander since 1951. Born in Minnesota in 1904, he was graduated from Hamline University in 1927. He was commissioned in 1930. In 1937 he attended Harvard's Graduate School of Business Administration. After various assignments at Wright-Patterson AFB and the Air Technical Service Command, he served in '49 at Hq., USAF as DCS, Comptroller.

How AMC Manages the Weapons

By Lt. Col. Edmund F. O'Connor

DIRECTORATE OF PROCUREMENT AND PRODUCTION, AMC

MANAGING the weapons with which we must fight, if war should come, has been streamlined to fit the technological race. This afternoon, then, I would like to talk about various phases of this management.

General Rawlings just said aircraft are worthless unless they are ready to go when they are needed. To be ready to go, the aircraft must have maintenance personnel to keep it repaired; supply personnel to provide spare parts; procurement assistance to purchase these parts; a tremendous amount of special and general purpose equipment is required for ground handling; and when it is off the ground, today's aircraft may well require aerial refueling.

All of these elements make up what we have termed a weapon system—an instrument of combat—ready to strike.

Management's job today is to relate the many elements of the system to a particular weapon. To do this, weapon system project offices have been established to guide the development, production, and support of weapons. These offices exercise management control of weapon system programs. They are charged with the responsibility for determining that certain and proper phasing actions are accomplished for the development, procurement, production, maintenance and supply support.

A weapon system project office is established for each major weapon within the Air Research and Development

(Continued on page 137)

RCA's COMPACT, LIGHT-WEIGHT, HIGH-PERFORMANCE RADAR . . .

a long step toward the ultimate weapon

While the "enemy" plane is still far beyond the sight of human eyes, this new radar system detects it. Mounted in the intercepting aircraft, it provides a continuous flow of information about the "enemy position," electronically computed in terms of range and rate of closing. When visual contact has been established, the firing is controlled by the pilot, aided by electronic calculations.

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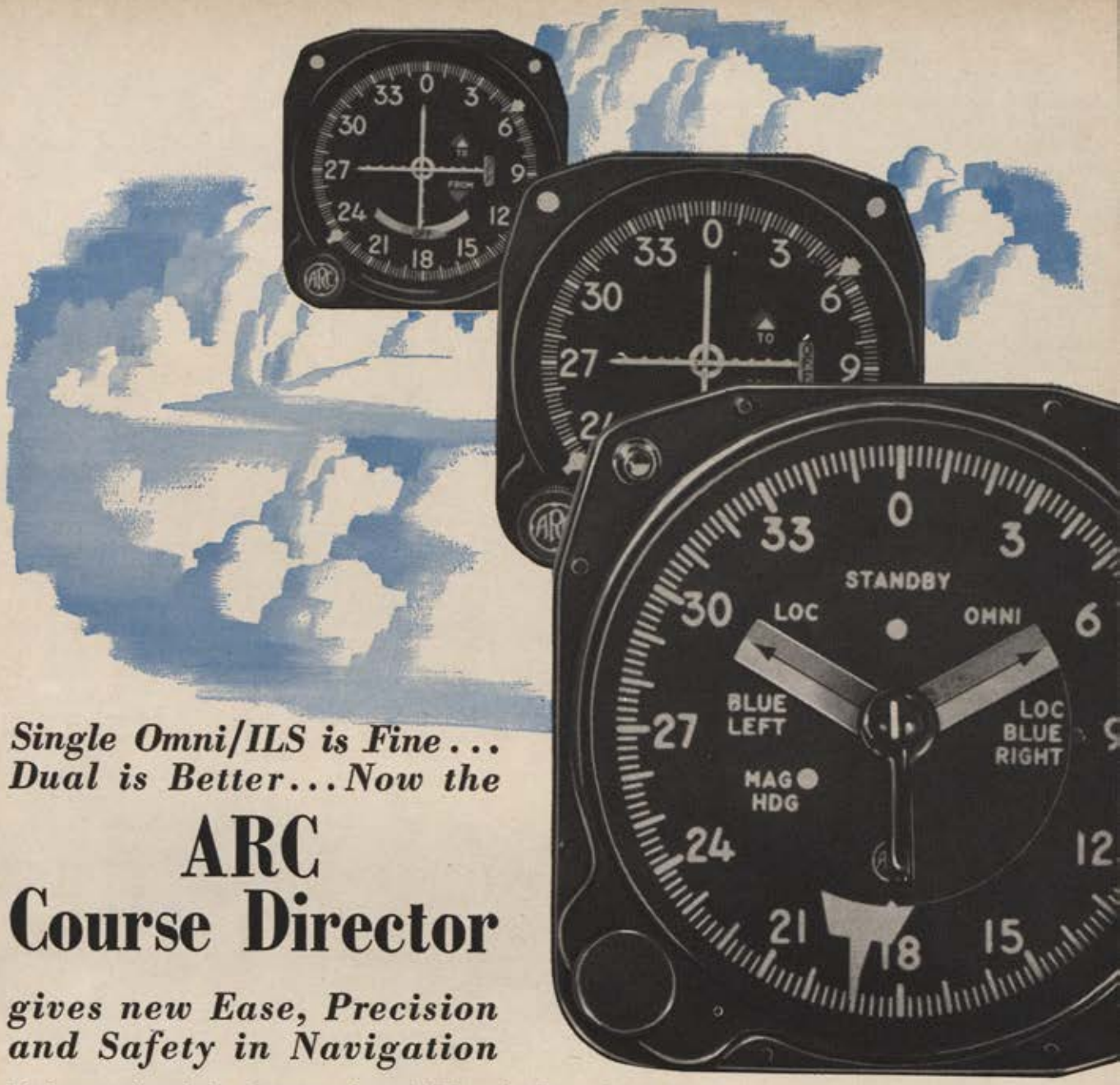

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Command and in the Air Materiel Command. Executive management responsibility passes from one command to the other during the life of the weapon. I will describe this in a little more detail in just a moment.

Initially the Air Force establishes the requirement for a weapon to perform with a specific mission capability. In the early stages the weapon is primarily the responsibility of Air Force headquarters, with the aid and advice of the using command, industry, the Air Research and Development Command, and the Air Materiel Command.

The Air Research and Development Command enters the initial development stage by working with industry on performance requirements, specifications and design, and ultimate capability. Executive management for the weapon in this phase is vested in the Air Research and Development Command.

Meanwhile the Air Materiel Command is fulfilling a vital support role. It is responsible for the procurement action on the weapon, and its planning is already under way for production, maintenance, and support of the weapon during its life.

When the decision is made to produce the weapon for the inventory, executive responsibility for the weapon is transferred to the Air Materiel Command. At this time, ARDC takes on a supporting role which it will maintain to some degree throughout the useful life of the weapon.

Both ARDC and AMC have been working diligently with industry to speed up the cycle of research and production. The long lead time now required to develop and produce a weapon is slowing our pace. As an illustration, the first planning for the B-52 started in 1946, and we are just now receiving the aircraft in quantity from the production line.

Within the Air Materiel Command, executive responsibility for the weapon remains in the Weapon System Project office at our headquarters in Dayton during the major production phase. When the modification and modernization of the weapon becomes the predominant job, the responsibility is transferred to one of the eight Air Materiel Areas in the United States. The Air Materiel Area, which has been participating in development and production of the earlier phases, will manage the weapon through the medium of such things as weapon phasing groups, until its ultimate stage of disposal.

The B-52 is the first to be managed as a weapon system in its entirety. ARDC and AMC have worked very closely with Boeing Airplane Company to phase this intercontinental bomber through successive stages of its life.

Today the executive responsibility for the B-52 is vested in the Weapon System Project office at AMC headquarters in Dayton. This office is now acting as the focal point for industry and Air Force activities on matters relating to the B-52 production program. Earlier ARDC was the executive agent when development was the major phase of the bomber's life.

Management responsibility for logistic action will be delegated to the Oklahoma City Air Materiel Area in the future, as soon as the weapon has progressed far enough through the production phase, just as was accomplished with the transfer of the chairmanship of the B-47 weapon phasing group meeting to Oklahoma City. The entire management for all related resources necessary to mission performance of this aircraft will then become the responsibility of Oklahoma City as the Lead Air Materiel Area.

This, then, is the type of management which we use for our weapons. Every resource at our command is related to the weapon, and as it progresses from research to production to modernization, executive management is transferred from the Air Research and Development Command to headquarters of the Air Materiel Command to the Lead Air Materiel Area.—END

LT. COL. EDMUND F. O'CONNOR

Colonel O'Connor is chief of the B-52 section office of AMC's Directorate of Procurement and Production. Born in Massachusetts in 1922, he was graduated from West Point in 1943. He served as a bomber pilot in the Mediterranean in WW II. From 1946 to 1950 he served at Wright-Patterson AFB, and then commanded the 26th Air Rescue Squadron in Japan before returning to AMC.

The Role of AMC in Weapon Systems Management

By Maj. Gen. William O. Senter

COMMANDER, OKLAHOMA CITY AIR MATERIEL AREA, AMC

IT IS A singular pleasure for me to participate in this convention of the Air Force Association. In fact, it is quite an honor to speak to representatives of twenty-five operational commands of the Air Materiel Command. Because of our common interest I feel that today I am talking to partners. The programs, policies, and far-reaching decisions are not made at my level, but it remains our job, you industrial representatives, and you Air Materiel commanders and industrial commanders, to implement the guidance handed down from above. We jointly share in the race that General Rawlings has been describing along with Colonel O'Connor.

To be the first across the finish line—wherever the line may be—we must effectively manage the products that technology has produced. This fast-moving race of science dictates what our jobs shall be since our country is being forced to sprint continuously to stay ahead of

(Continued on following page)

the scientific and technical improvements of our enemy.

We all recognize we no longer have sufficient time to conduct a build-up after hostilities begin. In view of this fast pace, the Air Force must be constantly alert for instantaneous action. The ability to attain and maintain a continuous state of readiness depends on many actions which must be phased together with the same smooth coordination of one relay runner passing the baton to another. Timing between the lead-time steps of translating facilities, skills, manpower, and money into a completed weapon must be as accurate as the sweep hand of the stop watch. A great advancement toward this objective is the logistic concept of management by weapon system.

The idea of management by weapon system is not new. Its objectives we have been trying to reach for years. Its application here was the outgrowth of the AMC decentralization which started back in 1952. Decentralization started for several reasons. First and foremost was to lessen the strategic vulnerability of the nerve center of the Air Force logistic system, our headquarters at Dayton. Second was to break down the various functions of the command into more manageable segments similar to trends in large industry.

We were thinking in terms of an entire weapon with all of its related equipment. One of the first approaches was to establish a project to determine whether or not it was feasible as well as desirable to vest complete logistic support of a given commodity in one area commander. That was in 1953. When the Air Force approved this general concept we called it "Logistics for '56."

Now, 1956 is here so let us look at weapon system management today. We now have what we call Lead Air Materiel Area responsibilities for certain specific weapons built by designated manufacturers. At Oklahoma City, we are the Lead AMA for B-52 aircraft.

Weapon system management means to a responsible manager that at all times he must be in a position to identify the readiness of a specific weapon to perform its assigned mission. He must coordinate all assets such as facilities, manpower, and dollars. These assets must be related directly to a weapon system and its mission. This is the objective.

As Colonel O'Connor pointed out, weapon system management has developed a single point of support responsibility, one of the major improvements for combat forces and industry.

For the operating commands this provides a single Air Force agency responsible for solving the logistic problems associated with their weapons. Oklahoma City works closely with the Strategic Air Command, since most of its bombers are supported by my headquarters. For an aircraft manufacturer, this enables a quicker solution of many technical and contractural problems that could be associated with the modification and overhaul of the weapons. From the support point of view this improves our capability since we get into the program at the production phase. The Strategic Air Command no longer must make fifteen calls to resolve a question of logistic support for one of its aircraft. One call will produce results. Industry also may now direct its logistic inquiries to one Air Materiel Area.

Technology itself has produced many of the tools we can use to make us a winner. In our management at Air Materiel Areas, we are constantly looking for the most effective tools.

Accurate and rapid data-processing is the keystone of sound logistics. It is a rapid means for determining

Maj. Gen. William O. Senter, head of AMC's Oklahoma City Air Materiel Area, addresses Combat Logistics Conference in New Orleans.

how much of what equipment is needed to perform a given mission; how much money will be required to procure it; how soon and in what quantities it will have to be replaced. Industry is helping to provide us with accurate data which speeds up the cycle of getting new items into the inventory. Under a year-old program, contractors write item descriptions for parts that have not been assigned Air Force stock numbers. Using these descriptions which are more accurate since they are prepared by the contractor personnel familiar with the item, Air Materiel Command headquarters can assign stock numbers. This action is completed before the provisioning conference. Keeping the shelves stocked involves a veritable flood of data which must be sorted and reduced to significant totals with maximum speed and accuracy. This is essential if we are to have the right amount of the right equipment at the right time and place, and without waste and without the delay which could mean disaster.

Electronic data-processing equipment gives every promise of yielding the solution so needed since we now have some one and one-quarter million items in our Air Force inventory. Already within the Air Materiel Command, we have two large types of electronic computers, the Sperry-Rand Univac and IBM 702, in operation. By this October AMC will be operating and performing development test work with seven large scale electronic computers. In addition there will be some fifteen smaller computers throughout the system.

The IBM 702 has been in operation at my headquarters at Tinker for almost a year. We have found it to be an excellent tool in logistic management. Two of the major programs being developed on the 702 are inventory control and configuration accounting.

Inventory control is always the potential quagmire of a logistic system. It is the area in which paperwork sprouts like a fungus, and constant reevaluation is essential to insure that the cost of the control does not outweigh inventory value itself. The continually shifting, multi-billion dollar global inventories pose an almost unique problem in this respect. We cannot safely trim provisioning to the most economical minimums unless our stocks are completely and immediately at our command at all times.

As part of inventory control, we are working diligently to effectively manage engine spare parts. The buyer's guide, which Supply uses to determine requirements, already has been put together by the computer for one class of parts. By use of the 702, we will have more accurate data faster. This will enable us to make more realistic procurements and better control our inventory.

MAJ. GEN. WILLIAM O. SENTER

General Senter has commanded the Oklahoma City Air Materiel Area of AMC since 1954. Born in 1910 in Texas, he was graduated from West Point in 1933 and entered flight training. He took a course in meteorology in 1937-38 at MIT and served in various weather control assignments until becoming weather officer of FEAF in 1945. After attending the Air War College, he served four years as chief of MATS Air Weather Service, Andrews AFB, Md.

Configuration accounting of aircraft was born of necessity. How could we effectively manage our huge inventory of aircraft and schedule them at the right time for modification and overhaul unless we knew the stage of life of each plane? Today, because of the essentiality of the Strategic Air Command interest, we are using the 702 to help us gather this basic information. This project will develop a centralized record for each individual B-47, B-52, and KC-135 aircraft. The information will be available to the combat commanders, and will cover the latest configuration data for use in scheduling, providing supply support, and budget estimating.

Electronic computing machinery is only one of the tools of modern technology that is available to us. In the field of communications rapid advancements are being made. General Rawlings mentioned the transceiver network that is tying together our world-wide system.

With this transceiver network a requisition can be dispatched, received, and work started on filling it in a matter of a few minutes. The transceiver is a punch card machine which receives electrical impulses and records the data from an identical machine thousands of miles away.

Format teletype requisitioning is another communication tool effectively utilized today. Requisitions are prepared on tape which is used for transmission by teletype. When received at the depot the information on the tape is converted into documents which represent a combination customer request and shipping document. Again the process from requested material has taken only a few minutes. These rapid means of communication help us reduce our inventory.

Effective as these technological tools may be and regardless of how well we can use them, we cannot win this race without the continued support of our industrial team member. As explained, their contacts are narrowed by working with weapon managers like Colonel O'Connor and myself. In addition we have large offices at the big plants as well as the procurement district offices in the large metropolitan areas. Offices in the plants represent all agencies of the Air Force. In fact, they are known as Air Force plant representatives. The plant representatives and procurement district chiefs maintain a close working relationship with industry.

We have seen that industry's role in the development of a weapon begins at its earliest stages. It continues throughout the life of the weapon. Engineering integrity is a vital necessity if the weapon receives proper in-service support. While the aircraft is in service, industry continues to engineer the application of improved technology —we must do this to capitalize on our huge investments.

Large programs of modification and overhaul are being done by industry. Today, approximately fifty percent of this aircraft work is being accomplished in contractor facilities. The complexity of the modification and repair program is apparent when it is realized that we were planning for this job through 1960 before the first B-52 was received in the active inventory.

Another management concept of today and one of paramount importance is the effective utilization of resources. The superior runner must make the best use of what he has in order to break the tape first.

One of the biggest jobs we have is to keep the weapons up to date. There is a continuing effort—among ARDC, AMC, and industry—to provide the combat forces with the most up-to-date weapon possible. We modernize aircraft by installing the latest equipment in the present hull. This modernization program has been used extensively on the B-47 aircraft which served as a test bed for this type of economy. Here we save not only money, but the important element of time.

(Continued on following page)

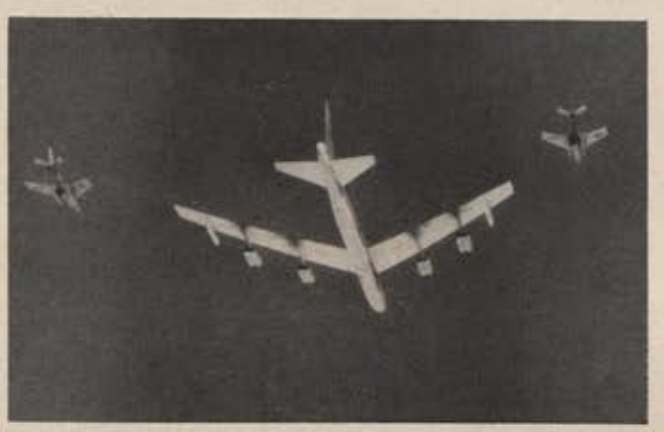
B-47s in for major overhaul roll down the 5,000-foot assembly line of Maintenance Engineering Directorate at OCAMA. This is the largest of OCAMA's three mission directorates and employs something in the neighborhood of 12,000 persons.

Keeping the aircraft in a state of readiness to take off on a moment's notice is imperative in utilizing our resources. The airplanes that do not fly because they lack certain parts could mean the difference between winning and losing.

The out-of-commission-for-parts rate for Oklahoma City's aircraft has been remarkably low. We aim to keep it so.

The supply priority system is helping us to do this job. Under this system the Air Staff assigns priorities based on the importance of the mission. We want to be sure the combat forces receive the required support.

Reducing stock levels will stretch our resources to new limits. Some of the methods we are using to accomplish this are better control and more rapid transportation. Control by dollar value gives us a firm grasp on the most expensive items. We identify items by cost and apply progressively detailed management to each of three categories. Hi-valu is the term we use to identify items in the first category, which covers items costing over five hundred dollars. About three percent of the items procured are in the hi-valu group, but they account for half of our initial aircraft support dollars. Naturally, they receive the most detailed management.



First B-52 arrives at Tinker, escorted by SAC F-84Fs. B-52 is just one weapon system OCAMA is responsible for.

Rapid transportation—the airlifting of supplies—allows us to move materiel to the combat forces in a shorter time. This shortening of the pipeline time results in reductions in inventory, packaging costs and their related drains on our pool of manpower, facilities, and materiel.

D-Day can be tomorrow, as General Rawlings said. Preparation day is today. Our present planning dictates that we must be prepared to fight a major offensive with the resources we have in being on D-Day. With this in mind, our operations are geared to anticipate requirements of the combat forces so that they may put more weapons over the target in the least time.

I am sure that you are aware of the constant alertness and vigil that prevails in the operations of our combat commands. By the nature of our assigned weapons, we play an essential part in the success or failure of these operations. We, within AMC, take pride in this partnership. The dominating principle of our war planning is to insure an orderly transition from peace to wartime operations with the minimum of confusion. This is being accomplished through training—executive and operational alike.

A key element in this training is the command nerve center—the command post where trained personnel are on duty around the clock. At the various command posts, we maintain our war plans plus those emergency actions that must be taken. At them we follow the daily operations of the combat forces, and from them we are prepared to swing vast resources into wartime operations.

At the outbreak of war, we can expect a rapid dissipation of our skilled "know-how." We are attempting to offset this condition by training our personnel how to act and think with a minimum of guidance. We must be self-sufficient or as nearly so as possible in the event of war. Transportation and communications lines may be disrupted, at least temporarily. Therefore, we must be prepared to operate on our own initiative and within our own resources.

Logistic support of the combat forces must be dynamic, not static. We must go to the customer to assist him with his logistic problems. Inertia is our most deadly enemy. We must get the needed maintenance or supplies to the user immediately upon awareness of his need. Here is the pay-off in training, and here is the opportunity for ingenuity and resourcefulness.

Training our people how to act under emergency war conditions is a part of our daily business. This we accomplish through numerous alerts and exercises both locally and held jointly with the using commands and our higher headquarters. For instance, the Air Materiel Area is prepared without advance notice, to render around-the-clock logistic support.

Mobile maintenance teams have been organized, trained, and equipped for immediate dispatch to support combat units. Shifted from their normal jobs, they would provide assistance required to return combat aircraft to the air. We presently have teams ready on call for day or night dispatch to home and staging bases of the combat forces.

All of us hope that our aircraft will never be required to drop one bomb. But if war comes, and it certainly would not be of our choosing, we must be ready to fight back instantly. This requires not only superior weapons, but the most effective management of the system that supports the weapon. Working with the combat commands, our headquarters, ARDC and industry, the Air Materiel Areas and their sister depots play a vital role in the life cycle of the weapon.

This afternoon, General Rawlings, Colonel O'Connor, and I have discussed air logistics in total war. Our job is meaningless unless it is related to the combat commands and their missions. A mountain of spare parts is worthless if it doesn't include the one that we need to put the bombers over the target. We have seen that utilization of resources will help us manage for the long pull.

Weapon system management enables us to respond faster and more accurately to the needs of combat commands. This type of management also better defines industry's contacts within the Air Force. Product reliability is encouraged. The successful completion of the mission of the combat crews as well as their very lives depends on the reliability of the weapons industry produces.

If D-Day is tomorrow, are we ready? AMC is continually striving to answer this question with an emphatic yes. The stakes for this race are the highest. Our freedom is the prize in the winner's circle. We in AMC will continue to work in preparation for the D-Day we hope will never come. We ask for your support to help us.—END

The audience at the Combat Logistics Conference put a number of questions to General Rawlings and General Senter after the formal presentations. The text of this portion of the program, taken from the transcript, is on page 143. — The Editors.

Fastest U. S. AIR FORCE TRANSPORT IN PRODUCTION

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POWERED BY FOUR 3,750-horsepower Allison T56 Turbo-Prop engines, driving three-bladed Aeroproducts turbo-propellers, the Lockheed C-130 Hercules attains top speeds of over 370 miles per hour. And it operates at less than half the ton-mile cost of its nearest competitor.

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Thus, the U. S. can put supply lines in the sky – with ability to airlift cargo, personnel and equipment from the continental U. S. to a distant overseas air base and reach a combat area shortly following the arrival of jet aircraft.

With full load, the C-130 takes off and climbs to 2,500 feet in 60 seconds – a remarkable feat for a large transport. The Hercules has a flexible flight envelope in that it has the ability to fly at low altitudes for airdrops of personnel and equipment and yet has a high-altitude range of 40,000 feet.

Product of a 5-year joint effort by the Air Force, Allison and Lockheed Aircraft, the C-130 is being produced in quantity by Lockheed's Marietta, Ga., plant. These high-performance Turbo-Prop transports will begin joining the Tactical Air Command late this year.

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Question: General Rawlings, I believe you made a comment that when missiles got into operation more, you anticipated some major changes in the procedures or perhaps organization of the command. Is it too early to comment on that?

General Rawlings: Well, I can comment to this degree, that as we get missiles into the inventory—and we do have the Matador missile in the inventory at the moment—as you know, you run into the problem of whether we are going to do the entire support job within our historic depot system or not. We don't know for sure. You have got a lot of conflicting requirements and problems, but it is certainly clear that we are going to have great difficulty in retaining the type of talent that is capable of working on these complicated components that go to make up these missiles. At the same time, there will probably be a development taking place in the improvement of these missiles, probably to a greater degree than we have experienced with aircraft themselves.

We don't know, but we expect that possibly there will be a great deal more direct relationship between the producer of the missile or the components and the actual site of operations. In other words, we probably won't go through the historic depot system. But this is still conjecture. We don't know because one of the other problems that we do have is to be in a position so that we are sure that we are ready to go every hour on the hour, and you can't get completely tied to one contractor, for example, where maybe a strike tomorrow morning puts you flat on your back. So, you do have that problem to consider.

I suspect, however, that it will take a considerable period of time since it will probably be quite a period of time over which the new weapons will be phased in the inventory and old weapons phased out. So, the problem will probably be a little further complicated by having to have several systems in operation concurrently. I am sure that if General LeMay were talking to you, he would tell you that he was not going to rely completely on a missile until he had had some experience with the missile, and how do we get that experience?

On the other hand, we certainly are in no position to build up a huge logistics organization to support those missiles before we know something about them. So, what I am trying to say is that it is going to take some real thinking, some real planning. We are trying to initiate that, and I personally suspect that there will be some very major change in the way our logistics system operates.

Question: We have read comparisons on research and development between United States and Russia on all of these weapons. How do their logistics compare with ours?

General Rawlings: As a matter of fact, we don't know a great deal about it. But I suspect from our experience in Korea that we can forecast a few things, and apparently they do have an effective logistics organization in terms of supporting that kind of effort because they were able to mount fighter attacks. Of course, they stood them down every once in a while. We always suspected that it was for technical and logistics problems, but, nevertheless, they were able to do a pretty fair task. They were able to deploy forces over widely scattered areas. We know they did a lot of flying. So, I think it is reasonable to assume that they have a fair logistics system. That doesn't mean that it would be the kind that we might necessarily call a "fair" one, but then our points of reference are not comparable either.

I suspect again, when we shift to the missile field, that anything we might know about their capabilities today might again be lost for the same reason that I mentioned. No one can be sure about what type of logistics system might be involved when we get to missiles. But it seems to me that probably their problem would be less than it would be now because if they have the capability of producing them, they probably would have the capability of working directly from producer to site on a one-shot go, which would be the kind of thing we are talking about.

This is speculation, but I think there is a fair basis for arriving at some of those conclusions.

Question: General Senter mentioned the three ranges of the value, the highest being $500 and up. I wonder what consideration has been given to something you might call a specific value or cost per unit in the over-all picture?

General Rawlings: Well, actually, the dollar basis alone is not the determinate of these three categories. We have what we call a hi-valu. We don't call it high cost. It is high value. It might, in a general way, be, say, things that are over $500, but if there is an item that is terribly important even though it might be slightly less, that in aggregate is large in dollar terms we would consider it in that group. Now, the reason we did this, I think, is rather clear: we have a million and a quarter items in the inventory. Historically, we have managed them or attempted to manage them in a similar way, whether they were nuts or bolts or airplanes. This doesn't make any sense in today's kind of situation. So, we tried to segment it so that we could put the greatest amount of our effort and management capability on what we call the hi-valu group, and then the intermediate group, a little lesser attention, and then in the lower value group, you might deal with it in barrels or bushels or by the pound or something, but not wasting our effort on the popcorn items but rather tend to put on the hi-valu.

Now, you might be interested that we carried that to the point where we indicated on our packaging. We have an identification mark, so that everybody who handles it in the system knows that this is an important item. He doesn't have to know much except color or read a couple of words and so forth, but we tried to carry this philosophy through the whole system. So that we really put the attention where we can do something about it. With about three percent of the items, as I recall, actually about nine or ten thousand items, if you have got control of those in terms of your dollars, you have got thirty or forty percent of your dollars in hand and, therefore, you can do a real job on the big dollars and the rest of it you don't worry too much about.

Now, I don't know whether this answers your specific question or not. I think you were trying to say, do we have a list of items and everything over that goes in this group just without any other consideration or not. That is not true. We do use a greater consideration than strictly a dollar line.

Question: What part does the lack of lubrication play in terms of out-of-commission of our equipment?

General Rawlings: I am uninformed on that particular point. I suspect that it can't be a really important factor, but obviously it must be a factor. In terms of the total of out-of-commission rate, it must not be too important or we would really be slugging at it.

Of course, we all know that things that move fast had better be lubricated. Certainly, I would say that it is just reasonable that at the higher temperatures we are going to get into, speeds increase, thinking of the northern and the southern climates. The question of lubrication is a very important problem, and I am sure a lot of effort is being put on it in the materials laboratory of the Air Research and Development Command.—END

Col. B. J. Campbell, Commander of the 302d Reserve Troop Carrier Wing, with his unit's award.

Commander of the 14th AF, Maj. Gen. George G. Finch, was military host.

THE RESERVE

M/Sgt. David L. Cochran, named outstanding ANG Airman, receives award from Gen. George Kenney.

M/Sgt. Doyle A. Webb shows his award to Gen. George C. Kenney and Lt. Gen. Charles B. Stone.

A RESERVE troop carrier wing from Ohio and an Air National Guard fighter squadron from Iowa received the Air Force Association's top Reserve and Guard unit awards at the annual convention in New Orleans last month.

The awards, presented annually by the Association to outstanding Air Force Reserve and Air National Guard units in the United States, went to the 302d Reserve Troop Carrier Wing of Clinton County AFB, Ohio, and to the 174th Air Guard Fighter-Interceptor Squadron of Sioux City, Iowa.

Presentations were made at a Reserve Forces Awards dinner, which climaxed the Reserve Forces day of the convention, by T. B. Herndon of Baton Rouge, La., chairman of AFA's National Reserve Council and a Reserve brigadier general. Col. B. J. Campbell, commander of the Reserve wing, accepted for his unit and Maj. Donald W. Forney, commander of the 174th, accepted for the Iowa squadron.

M/Sgt. David L. Cochran of the Air Guard's 124th Air Defense Fighter Group at Boise, Idaho, received the Association's award as the most outstanding Air National Guard airman in the United States. A similar award for his selection as the most outstanding Air Force Reserve airman in the United States went to M/Sgt. Doyle A. Webb of the 9805th Air Reserve Squadron at Longview,

Seminar Moderator was John R. Alison, outgoing AFA Board Chairman.

Seminar panel, from left: Brig. Gen. Jerry W. Davidson, Commander, 448th Fighter Bomber Wing; Col. James M. Trail, Iraho ANG; and Col. Bernard Rose, USAFR.

FORCES AWARDS

Reserve, Air National Guard units and individuals are honored by AFA in New Orleans

Tex. These awards were made by Gen. George C. Kenney, former Chairman of the Board of AFA.

The Association's Earl T. Ricks Memorial Trophy was presented to Maj. David F. McCallister, commander of Delaware's 142d Air Guard fighter squadron for his victory in the third annual AFA Ricks Memorial Trophy event. McCallister led a field of seven in a jet flight from San Francisco to New Orleans.

Second, third and fourth place plaques were awarded at the dinner to Capt. Vernon D. Jersey of Indiana, Capt. C. R. Carmichael of North Carolina, and Maj. Leland W. Cranmer of New Jersey.

The Ricks awards were made by Alfred C. Schwab, Jr., of Minneapolis, chairman of AFA's Air Guard Council.

Final Reserve Forces action of the convention came in the adoption of three resolutions.

The first asked that for periods of field training, Air Force Reserve and ANG airmen be given the same quarters allowances as active duty airmen receive.

The second urged that Reserve and Guard officers, recalled for four-year tours of active duty for the specific purpose of advising Air Force commands on Reserve Forces matters, be excluded from Air Force troop ceilings.

The third called—for the second straight year—for elevating the office of the Assistant Chief of Staff for Reserve Forces in the Pentagon to three-star level.—END

Seminar speakers were, from left: Gen. O. P. Weyland, TAC Commander; Lt. Gen. Charles B. Stone III, ConAC Commander; Maj. Gen. Winston P. Wilson, Chief, AF Division, National Guard Bureau; Mr. L. R. Boulware, Vice President, Public & Employee Relations, General Electric Co.; Brig. Gen. Robert L. Scott, then Director of Information Services, USAF; and Maj. Gen. William E. Hall, the Assistant Chief of Staff for Reserve Forces.

Why Our Reserve Forces Have to Be Battle-Ready

The Hon. David S. Smith

ASSISTANT SECRETARY OF THE AF, MANPOWER AND PERSONNEL

MY VISIT with you here in New Orleans has told me a lot about a vital element of the Reserve program that no amount of briefings and reports could supply —that is the *enthusiasm*, *interest*, and *dedication* of the people who carry it forward. The importance of these qualities in our human element is further signified by your choice of "Manpower in the Jet Age" as this year's convention theme.

Considering the realistic and critical roles spelled out for the Air Force Reserve components in our current war plans, your concern with our over-all personnel program is well founded. And I hope to drive home that point today by presenting some of the manpower factors that underscore the importance of reserve augmentation to the regular establishment.

Traditionally, our nation has maintained military reserves in the somewhat casual and comforting philosophy that they were a convenient alternative to large, active-duty elements. And because of the long mobilization time assured in past wars, their state of readiness was not a problem of great urgency.

By contrast, the advent of atomic weapons and long-range delivery aircraft requires that the Reserve forces of the Air Force be maintained in a state of instant readiness for combat. Far from being merely *convenient*, these Reserve forces are now a *necessary* alternative to a large permanent establishment and for this reason: We cannot accept indefinitely the cost of supporting an active-duty force of the size required to meet all contingencies. To stay within our resources in manpower and funds we must therefore increasingly rely on the less costly protection that Reserve forces provide.

THE HON. DAVID S. SMITH

Mr. Smith is Assistant Secretary of the AF, Manpower and Personnel. He was born in Omaha, Nebr., in 1918, was graduated from Dartmouth (magna cum laude) in 1939 and from Columbia Law School in 1942. During World War II he served with the Navy in the Pacific, participating in many amphibious landings. He returned to private law practice in 1946 and was appointed to his present position in 1954. His principal duties include supervision of the AF military and civilian personnel programs and policies.

These are the major considerations that dominate our present manpower policies governing the Regular and Reserve components.

First let's look briefly at the manpower situation of our Regular components from the standpoint of quantity, overall quality, and specific skills. This will provide a significant indication of our total combat readiness; and will throw some additional light on personnel trends of Reserve components that have been detailed for you earlier today.

By increasing the ratio of operational personnel to those in training and support activities and by substituting civilians for airmen in more than 30,000 non-combat jobs we will be able to support the present Air Force program to

(Continued on page 148)

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achieve 137 wings. From the standpoint of numbers or quantity, our situation offers no cause for concern.

However, the problem of meeting our qualitative requirements is critical at this time and will become increasingly so as we move farther into the era of supersonic flight and guided missiles.

To appreciate fully the sense of urgency that pervades our effort to increase the experience level and skill level of aircrew members and technicians we need first to examine the broader implications of our onrushing technology as they relate to the human element of airpower.

First of all there is the necessity of increasing the technical and physical capacities of the individual pilot and maintenance man at the same tremendous rate—a rate approximating geometric progression—that now characterizes our forward strides in the development of new weapon systems. Our research and development people have repeatedly stated, and with good reason, that we can no longer go ahead with new projects that promise only moderate improvements in speed, range, altitude, and firepower. To do so would simply squander our already heavily taxed research, production, and training facilities. We are, therefore, concentrating on those programs that bring major advances in the performance of our plans, our missiles, and the many electronic components of their radar environment. Increased complexity is an unavoidable result.

It follows that we must be equally concerned with achieving a comparable increase in the technical knowledge and skill of our people. The major difficulty we face in gaining full acceptance of that requirement on the part of the public is that human performance does not lend itself to the same explicit terms of comparison and measurement that keep our radar-guided rocket armed, our supersonic aircraft and our guided missiles in the spotlight of publicity. This offers no excuse for defaulting our responsibility to explain our increased need for skilled personnel in terms that do make sense, in terms that do command attention, and in terms that will evoke the public support we must have to obtain qualified people and to retain them.

I would ask those people who place the importance of hardware improvement above the question of human skill to consider these questions: How much margin for error of judgment can we allow the aircraft commander of a B-52 who might be called upon to deliver a nuclear weapon against a vital enemy target at intercontinental range? What shortcomings in technical knowledge and job interest can we tolerate in the maintenance men who keep this plane ready for flight? What limitations in courage and combative spirit can we overlook in the fighter pilot who must trap himself into a supersonic F-104 Starfighter and fly it right up to the limit of its fuel capacity and speed to hit a target?

The answer in each case obviously is that we can accept no deficiency in skill or stamina that proper selection, training, and motivation can overcome.

Equally apparent is the fact that we are depending more and more on the merit of individual performance. This rules out once and for all any impersonal, wholesale approach to Air Force manpower matters in the Jet Age.

If we accept this proposition, the remaining element of the qualitative problem is a matter of deciding what standards of selection to establish, how much training is enough, and what factors of motivation will suffice. The specific answers to these questions are each day being sought, analyzed, and evaluated by our Human Resources Research Center, by our training command, and by our operational combat units. In addition to examinations that indicate the general suitability of our people for military duty, we administer aptitude and achievement tests that give us an increasingly reliable prediction of success in specialized training. The pay-off on this system can be measured in terms of greater combat capability and savings in both time and money.

This refinement of our selection system, coupled with an intensified program for streamlining and accelerating technical training courses, has done much to offset our post-Korea skill losses that reached a peak during the two-year period beginning in mid-1954. However, several skill areas are still critical. Among officers we need more experienced jet pilots and specialists in communications, weather, and armament fields. In the airman category we are short of radar specialists, air traffic control operators, and mechanics for both piston-driven and jet aircraft. While these do not represent all of the specialties for which additional people are needed, they do identify some of the skills in which our deficiency has reached a point that impairs the combat-readiness of our operational elements.

To overcome these problems we have accelerated our efforts to reenlist airmen who have acquired the needed skills and experience through prior service and we have put into effect a limited selective recall program for officers.

But these are stop-gap measures. The long-term solution demands a two-fold effort to insure, first, that new people coming into the Air Force have the capacity to absorb intensive training in highly technical areas; and, second, that a much greater number of our technically trained officers and airmen remain in the service. In both of these areas we are now, and will probably continue to be, in competition with civilian industry which has a growing demand for technicians.

There are several major transitions in our pattern of national growth that account for the present over-extension of our manpower force. At first the principal effort that absorbed the productivity of our manpower force was that of developing new areas behind our advancing frontiers. We were basically an agricultural nation. During the industrial revolution, our need for artisans and craftsmen was met by a constant stream of emigrants who had served their apprenticeship in Europe.

However, these automatic manpower dividends did not supply all the skill requirements of our twentieth century technological revolution that is still gaining momentum. The manifold industrial applications of each breakthrough have brought an increasing demand for scientists, engineers, and technicians.

Now we face a dual requirement for expanding our technical manpower—first, to support the upward trend of living standards for an expanding population by developing new sources of power and conserving our natural resources; and second, to maintain the qualitative lead over the Soviet in the development of air weapons.

Although our civilian and military leaders have urged an accelerated national effort to produce more technically trained people the time is still far off—if in fact it ever comes—when the supply will be adequate to both industrial and military needs.

Meanwhile we must expect that competition between these two important segments of our society will continue. And there are strong indications at the moment that the drawing power for highly qualified people is one sidedly in favor of talent-seeking civilian organizations. To establish the necessary balance that will guarantee a qualitative manpower level demanded for Air Force operations we have undertaken an intensive program to attract and retain capable people.

As a basic premise, we recognize that patriotic appeals must be accompanied by material compensation and inducement. Over limited periods of national emergency our people can be expected to perform military duties at a great sacrifice of personal interest. However, they should not be expected to shoulder those responsibilities indefinitely without receiving benefits in pay, living conditions, and prestige which they could obtain in civilian employment.

Recommendations based on these facts have produced a wide range of beneficial legislation and many improvements of Air Force–controlled personnel policies and actions that affect the stability, job satisfaction, and living conditions of our people.

Taken together they show a considerable gain. We have a dependent medical care bill that will extend attention to the families of all of our military people. We have a survivor benefits bill that greatly improves the security of service families. The Regular Officer Augmentation Bill has raised the ceiling for regular officers from 27,500 to 69,425, thus greatly increasing career opportunity for the Reservist. We have also obtained a provision for retirement in the highest grade held and for lump sum readjustment pay of Reservists who are separated involuntarily after five years' service.

Recent Air Force personnel policies have brought a reduction of transfers as far as our overseas commitments and training requirements will permit; an improvement of assignment systems for both enlisted and commissioned personnel; and the placement of non-commissioned personnel in jobs which permit a fuller exercise of their initiative and responsibility.

These are some of the actions that account for our success in more than doubling the over-all reenlistment rate for the Air Force since mid-1954. But we still are not keeping with us enough airmen who are experienced and skilled in the technical fields, or enough of our younger flying officers to maintain an effective experience level in our combat elements. So the need for additional action is apparent. An important measure to secure further service benefits is now being carried out by the Cordiner Committee on professional and technical compensations. On the basis of information gained through visits at scores of representative military bases around the world this committee will recommend a vigorous program of legislative and administrative actions to attract and retain the leadership and skills required for our present and future military forces. Special attention will be given to the problem of developing and maintaining a breadth of technical competence that will insure optimum performance of our complex and expensive air weapons.

In July, the members of this committee visited the Strategic Air Command and Air Defense Command, and in the coming months they will look into the conditions under which our people live and work in Europe, Africa, and the Pacific, and in the remote, isolated bases of the Far North. Their first-hand experience on these contacts will help substantiate their recommendations relating to job-pricing and to the concept of salary increases for people in our shortage areas.

This is the status and direction of Jet Age manpower trends in the regular establishment. The major implications for Reserve components are clear enough—namely, less need for quantity and more need for quality as measured by skill and combat readiness. However, I am sure that you want to know in more specific terms what effects these trends will produce in the roles and structure of our reserve elements.

As we bring new weapon systems—including guided missiles and manned aircraft—into the Air Force, our total striking power or "kill capability" for a given level of manpower will greatly increase. The matter of personnel strength for any time period will be a question of judgment as to how much combat capability we need to maintain a firm position of deterrence. But the increased speed and range of Soviet delivery vehicles for atomic weapons introduces this compelling element of certainty as to the character of both our own weapons and our manpower force: They must be instantly ready for combat. Already the time required for our reaction to aggression has been reduced from months to a matter of hours. It will be further reduced to a matter of minutes.

The eventual impact of this situation on the training, equipment, and composition of Reserve components is apparent. In order to retain their present relationship to the Regular establishment—as augmentation forces and as a replacement source for attrition losses—their readiness for immediate response must correspondingly increase. This obviously means that the introduction of more guided missiles to supplement and replace substantial segments of manned aircraft will bring our Reserve components into the guided missile business.

When the time comes to select Reserve personnel for assignments to guided missile sites, their proficiency in engineering and technical fields will be the deciding factor in determining their qualifications for the job. The thousands of ROTC graduates and airmen who in recent months have gone from active duty to the Reserve will give us far greater selectivity in filling all our technical assignments.

This compensates, to a degree, for the loss of their skills to the Regular establishment. Their full effectiveness in the Reserve depends on their willingness to accept ready status through active participation with Reserve forces units and in mobilization assignments. Your encouragement to these young people can greatly assist our efforts to secure their active participation.

On my visits this summer with personnel at Air National Guard encampments I was impressed by their capability to maintain and operate their recently acquired jet aircraft. The pay-off on this modernization program is also being demonstrated by Air National Guard interceptor crews which are standing alerts at nineteen strategic points across the nation.

This month Air Force Reserve units will join the Eighteenth Air Force and the Army's Eighteenth Airborne Corps in simulating paratroop assault missions. And air defense units of the Reserve forces are now scheduled to fly interceptor training missions against bombers of the Strategic Air Command.

On an individual basis our Reservists in mobilization assignments are performing capably in a wide range of technical and administrative jobs

From the standpoint of solid achievement it is, therefore, clear that our task for the future is not to devise new Reserve programs but to make the present one more effective.

In conclusion, I hope that my remarks tonight have conveyed to you the immense pride I have in the splendid achievements of our people of the Regular and Reserve components in maintaining the global striking power of the US Air Force as an instrument to prevent war.

More importantly, I hope I have made a convincing case for my principal thesis—that the highly skilled and dedicated airman is our key to airpower and survival in the Jet Age.—END

Facilities and Equipment—Biggest Reserve Headaches

Maj. Gen. William E. Hall

ASSISTANT CHIEF OF STAFF FOR RESERVE FORCES

WHEN I talked with members of your Association at last year's convention in California, the Air Force Reserve program was in a stage of transition. A firm mobilization requirement had been established for the Air National Guard and Air Force Reserve. The number of combat and support units and the number of trained individuals needed for augmentation and replacement had been clearly defined.

But the Air Staff was still in the process of reexamining all policies and programs with respect to the Reserve forces, as directed by the Chief of Staff, and much administrative work remained to be done in reshaping these forces to fit their D-Day missions.

Today, it is gratifying to report that the Reserve forces have reached an operational stage. While we still have a long way to go before attaining the desired degree of combat capability in the Reserves, sizable percentages of these forces are engaged in thoroughly realistic training and exercises, and are approaching their goal of operational readiness. A few examples are worth noting.

Seventeen fighter squadrons of the Air National Guard and a fighter-bomber wing of the Air Force Reserve are now standing runway alert with Air Defense Command, gaining valuable training experience and augmenting our country's air defense capability.

Late this summer, Reserve troop carrier wings and aerial port squadrons will participate with regular Air Force units in a mass drop of units of the Army's airborne personnel and equipment.

ConAC and Air Defense Command have a plan to carry out a Reserve forces air defense training exercise against SAC bombers, with the bombers flying a north-to-south course on routes and in numbers unknown to the defending force.

MAJ. GEN. WILLIAM E. HALL

General Hall is Assistant Chief of Staff for Reserve Forces, USAF. A native of McAlester, Okla., he was born in 1907, was graduated from West Point in 1929, and received his wings in 1934. In 1941 he came to AF Headquarters as special assistant to the Air Inspector and, later, was Secretary of the Air Staff and Deputy Chief of Air Staff. In 1944 he was assigned to the Fifteenth AF in the Mediterranean as Chief of the American Mission to Bulgaria and then became Commanding General of the Fifteenth AF in Italy. General Hall is a command pilot, combat observer and aircraft observer. He assumed his present position in 1952.

Reserve troop carrier units are taking part in various disaster relief missions and combat cargo operations. The largest of the latter to date is the Caribbean airlift being performed for the Coast Guard.

A short time ago, the Joint Chiefs of Staff directed the US Coast Guard to establish seven Loran stations in the Caribbean area within the period June 15-November 1, 1956. The Commandant of the Coast Guard requested Air Force Reserve assistance in airlifting 2,000,000 pounds of material for these sites. Since the Air Force Reserve troop carrier wings have a training commitment to conduct long-range overwater training missions, and since the Reserve wings have the capability, Continental Air Command agreed to airlift 2,000,000 cargo pounds for the Coast Guard utilizing—to the fullest degree possible—Reserve wings during their summer active-duty training periods. A total of 1,400,000 pounds will be flown during these periods. The residual 600,000 pounds will be airlifted between September 1 and November 1 by Reserve aircrews on special tours of duty. A minimum of two missions a day are being flown from Floyd Bennet Airport via Miami Airport to points in the Caribbean.

This operation has gone extremely

well. As of July 15, 86,255 pounds of cargo had departed the loading point at the New York Naval Air Station and been offloaded at the destination. Fifty-five sorties (return of aircraft to Miami) had been completed and no accidents or difficulties encountered. Here is practical training combined with a direct airlift contribution to the Department of Defense.

I would like to observe that this practical and useful type of training is not confined to flying units. For example, today in Hawaii, support units of the Air National Guard are contributing in a substantial way to the defense of that area not only by means of fighter direction activities but with twenty-four-hour warning operations.

These few instances are cited to indicate the broad pattern of operational capability being developed for all segments of the Reserve forces. The Directorate of Manpower and Organization is at this moment exploring the possibility of having all flying units receive training with the commands to which they would go in event of emergency. Individual training also is hewing to a realistic line, with all active-duty training being performed with the commands of assignment.

Attainment of full operational readiness at the earliest practicable date is the primary aim in today's Reserve program. It must be always remembered that present Air Force Reserve requirements—both for units and individuals—are based on the latest Air Force war plan which supports the current Joint Chiefs of Staff war plan. The Joint Chiefs' plan, naturally, is very broad in its concepts. These concepts have to be worked out in detail by approved war plans of the individual services.

The current Air Force war plan spells out clearly and firmly the Reserve requirements and contains the basic concept that our Reserve forces will be needed within the early days of hostilities. It may be well to review briefly these requirements, for that will help indicate both the progress made during the past year and the problems remaining.

While, as you know, I am responsible for coordinating staff efforts on Reserve affairs and closely monitoring the over-all planning and implementation of programs for both the Air National Guard and the Air Force Reserve, General Wilson, Chief of the Air Force Division of the National Guard Bureau, is on the program here today and so I will refer to the Guard only in its relation to the over-all Reserve program and leave to him any discussion of specific Air Guard policies.

The Air Force has two distinct wartime objectives for its Reserve forces. They are to provide combat and support type units as necessary augmentation forces in either a limited or full-scale war and, secondly, to provide the Air Force with trained, ready personnel for augmentation and replacement.

First, the unit program. Current war planing calls for twenty-seven combat wings in the Air National Guard and twenty-four in the Air Force Reserve, plus flying and non-flying support units. The Air National Guard is composed of twenty-three fighter-interceptor wings, two tactical reconnaissance, and two tactical bomber wings, for a total of twenty-seven. In addition, the Air Guard has four air resupply groups and four air transport squadrons (AE).

The Air Force Reserve is made up of nine fighter-bomber wings, which have an initial air defense role, two tactical bomber wings, and thirteen troop carrier wings. The Reserve's flying support unit program includes three air rescue squadrons.

Both Reserve components have numerous non-flying support units such as tactical control, communications, airways and air communications service, medical, and the like.

Personnel-wise, the unit-requirement of the Reserve forces under current war planning is for a total of 202,000 officers and airmen. Basic T/Os of Reserve units are identical to those of the active establishment.

The current war plan requirement for individuals to be trained by the Air Force Reserve totals 112,000. These augmentation and replacement personnel are assigned directly to the units within the active Air Force which have D-Day personnel deficiencies. Some train directly with their units of assignment, others train in and are administered by Air Reserve Centers throughout the country.

It must be stressed that the individual Reserve requirement is not a "guesstimate" or haphazard calculation. Each major command, both in the ZI and overseas, upon receipt of the Air Force war plan, computes its augmentation and replacement requirements by grade and skill in the light of its specific mission assigned by the war plan. Augmentation requirements represent those personnel increases necessary to bring units up to full wartime strength. Replacements are mainly personnel needed to fill positions which, upon mobilization would be vacated by rated personnel who would fill cockpit slots post-D-Day.

The computations of the various commands, including overseas augmentation needs, are sent to headquarters. There, one more computation becomes necessary to obtain a final determination of the numbers, grades, and skills needed to carry out the war plan. Taking the computations of the major commands as a base, the personnel planning people in headquarters then apply the factors which determine the additional numbers of officers and airmen needed to provide for anticipated attrition of the force. Many factors enter into this calculation. They include estimated deaths caused by use of nuclear weapons as well as such normal non-combat attrition as deaths, medical discharges, separations for hardship, and reasons of security.

Thus, the augmentation and replacement requirements, combined with the figure for expected attrition, produce a grand total or end figure which becomes the major command authorization. This is broken down by the major command to its using units.

It is apparent from the foregoing that D-Day availability applies to individual specialists quite as completely as to the personnel of combat units. The paramount requirement is that Reservists must be ready when the Air Force needs them. That might be D-Day; it might be as much as D-plus-six days. In any event, no time can be allowed for processing or administrative details. It is absolutely essential that all Reservists on whom the Air Force is counting in a time of national emergency must, henceforward, have their availability predetermined long before an emergency erupts. Briefly, all the 314,000 officers and airmen of the unit and individual programs of the Reserve components must be in AA Ready category.

During the past year, vigorous screening procedures have been introduced to assure that degree of availability. As a result, from a personnel standpoint, the Reserve forces are in a far better condition of operational readiness than they were a year ago. However, the screening process is not 100 percent complete and probably never will be. Since personal situations are subject to change, screening will no doubt always have to be a continuing procedure, if the Reserve forces are to reach and maintain an acceptable degree of combat readiness.

In recent months a number of actions have been taken at the headquarters level to encourage participation and enhance training. Special efforts have been made, in particular, to provide adequate compensation for

(Continued on following page)

Reservists. Among the more important of these actions has been the provision of an additional thirty-six paid drills per year for unit flying personnel and the doubling to forty-eight the number of paid drills for rated mobilization assignees, and to twenty-four the number of paid drills for non-rated assignees. It is believed that these increases will do much to stimulate maximum participation, although the Air Force Reserve continues to be plagued seriously by a shortage of participating airmen.

Manning of the Reserve forces does not appear to be nearly as serious a hurdle at this point as the lack of adequate facilities. This is the controlling factor of the moment. While some improvement has taken place in the facilities situation during the past fiscal year, it is no secret that the results have been far below our hopes.

The Air National Guard has completed the major portion of its long-range construction program, but the Air Force Reserve is standing very short on facilities, especially flying facilities. This is a many-sided problem. Due to the budget structure of the Air Force under the integrated staff concept, all the line items for Reserve construction are included in the Air Force military construction program. This places the Reserve in a position where it is competing for dollars with items considered essential in achieving the goals of the 137-wing force. The policy of the Air Force must be to take care of "first things first" within the availability of the limited funds available. When it becomes a matter of choice as to whether a runway will be extended at an Air Defense Command base to accommodate the Century Series fighters or build a maintenance hangar for a Reserve troop carrier squadron, it is obvious which will be funded first.

Nobody quarrels with this position, since everyone recognizes the importance of achieving the 137-wing force as soon as possible. On the other hand, the Chief and Vice Chief of Staff, the Commander of ConAC, and all the rest of us charged with building combat-capable Reserve forces also realize that something must be done, and quickly, to provide the Reserve wings with the sixty-one flying locations they need for training.

Lack of funds, however, is not the only handicap. In a disturbing number of communities, public, and official opposition to Reserve use of municipal airports has been, and continues to be, encountered. For example, in twenty of America's largest cities, the Air Force Reserve is operating from only five municipal airports and has been asked to move from two of those.

The entire facilities shortage is pointed up by the fact that the outlook for certain aircraft for the Reserve forces is more promising than ever before.

The Chief of Staff has directed that Reserve units will be fully equipped with aircraft capable of carrying out the D-Day mission by the earliest practical date. This objective—insofar as fighter-bomber units are concerned—is much nearer our grasp than was anticipated a year ago. All piston-engine fighters have been phased out of the Air Force Reserve and the Guard is rapidly phasing out the relatively few it has left. The only reason these have not already been phased out is a shortage of flying fields with adequate runways to accommodate jets.

Between them, the Reserve components have an inventory of more than 2,800 aircraft of all types—including fighters, light bombers, transports, and support and trainer aircraft. Of the present total fighter inventory of 1,917 aircraft, 1,767 are jets of such types as F-94s, F-84Fs, F-86s, and F-89s. The remaining 150 aircraft are F-51s. The present outlook for additional jet fighters becoming available from the active establishment inventory to equip reserve units is highly promising.

Equipping of the thirteen troop carrier wings of the Air Force Reserve and the air resupply and air transport units of the Guard is a more difficult problem. The Reserve forces have on hand only about 270 transport aircraft, or about one-third the ultimate requirement, and these are obsolescent C-46s and C-119s. The C-46 has fought two wars and, while a very capable aircraft, is difficult to use in cargo drops and almost impossible to use for heavy equipment drops. The C-119 is a more modern aircraft, but it is no debutante and the few the Reserve forces have are all veterans that have seen hard use. Both the '46s and '119s impose maintenance problems that will not diminish with time. If the Reserve forces' troop carrier, air transport, and air resupply units are ever to reach their full combat capability and potential, purchase of new cargo-type aircraft will perhaps be the only answer.

To sum up, the Air Force has an accepted requirement for Reserve forces in being that will be combat-ready at all times and is today moving steadily toward that goal. While there are limitations as to the speed with which operational readiness can be achieved, the determination to achieve it is firm and constant.

It is interesting to note that the United States is not alone in recognizing the great potential usefulness of Reserve organizations. Soviet Russia also understands the need and is doing something about it.

There is no organized reserve in the USSR in terms of specific numbered reserve units. However, all officers and enlisted men who have been released from active duty in the Air Force are reserves and are subject to recall in an emergency. A large number spend two weeks of refresher training in the summer.

The USSR is divided into military districts, each of which has a number of registration offices which maintain records of all eligible males in the area. Recall to duty is based on quotas by a branch of service levied on each military district.

An important element in the USSR's reserve picture is the all union voluntary association for cooperation with the Army, Aviation, and the Fleet, which is known by its abbreviation DOSAAF. This organization contains a large number of pilots, engineers, and other types of military specialists who serve as instructors for youths who take pre-military training at DOSAAF installations. The teen-agers so trained form a nucleus for expanding the regular training system in time of war.

Officers who accompanied the Chief of Staff on his recent visit to Russia saw numerous evidences of the pride the Soviets take in their auxiliary organization. While no precise knowledge of the organization itself was forthcoming, the participation by DOSAAF personnel in the Red Air Force Day show was acknowledged in various ways. The show program, printed in English, gave the names of DOSAAF pilots who were flying many of the aircraft in the show and DOSAAF flags were flown from street pillars along with those of the Soviet Air Force. Briefly, there is every reason to believe that the Soviets clearly perceive the value of retaining aviation skills to the fullest extent possible and of utilizing them in the broad air-age education program of their nation.

It has been a privilege for me to appear before this seminar, and I am looking forward to another of AFA's highly constructive conventions.—END

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Combat Capability of Air Guard on Upward Curve

Maj. Gen. Winston P. Wilson

CHIEF, AF DIVISION, NATIONAL GUARD BUREAU

IT HAS BEEN four years ago that the first Air National Guard units returned from Korean duty and the long-range plans for the Air National Guard began to take shape. Those four years have seen a major conversion of our tactical units from conventional to jet aircraft and the reorganization of the Air National Guard organizational structure to fit the mobilization requirements of the United States Air Force.

The fiscal year just completed was noteworthy in many respects. Our personnel program was highly successful and our pilot training program particularly productive. We increased our jet aircraft inventory by 200, while phasing out conventional aircraft and earlier model jets. We just about licked the F-89 maintenance problems and we were able to overcome a number of installations problems that plagued us for years. Extra training periods mentioned by General Hall were approved for aircrew members and the program implemented last quarter. Eight squadrons were added to the all-weather fighter program and the Air Defense Command Air Alert program was expanded from seventeen to nineteen squadrons. Finally eight of our tactical wings were reorganized during the last quarter to the Air Defense concept, implementing a program for sixteen such conversions which will extend through fiscal year 1959.

In the personnel area, the Air National Guard added approximately 900 officers and 5,500 airmen for an end-year strength of 7,300 officers and 56,600 airmen. Because many Air National Guard units were virtually at full strength, we realized at the outset of the year that the accomplishment of our personnel program would be no easy task. Consequently, I am pleased to report that not only did we attain our objective, but we actually exceeded our programmed airmen strength by over 700. In the officer area, acceleration of the all-weather program emphasized a problem area, the shortage of radar observers, and these officers, together with weather and medical officers, make up the hard-core shortage of specialists upon which the Air National Guard is concentrating its efforts. We are starting to show some progress in licking the observer problem. We are picking up observers at the rate of ten to fifteen per month and we now have over 110 trainees in observer school. It is our objective to put observer training on the same sound footing as the Air National Guard pilot training program.

Speaking of pilot training, I regard the success of this program as one of the highlights of fiscal year 1956. The results are particularly pleasing. Our objective this year was to produce 350 graduates from pilot training and to place 546 officers and cadets in pilot training. We exceeded both objectives. At the end of June, we had approximately 700 officers and cadets in pilot training—the greatest number in training at any one time since the start of the Air National Guard pilot training program. Before leaving the pilot area, I would like to point out that, with few exceptions, pilots being assigned to Air Guard units are either the products of our own pilot training program or pilots recently released by the regular establishment. Virtually all of the latter graduated from flying

(Continued on following page)

MAJ. GEN. WINSTON P. WILSON *General Wilson is Chief of the AF Division, National Guard Bureau. He was born in Arkansas in 1911 and was graduated from Hendrix College there in 1934. Following a cadet observer training course, he was commissioned a second lieutenant in the Arkansas National Guard in 1940. He assumed his present position in 1955.*

school since 1951, and the addition of these younger men has reduced the average age of our tactical pilots and given the Air National Guard an increased combat capability. Because our units have concentrated their efforts on securing these recent graduates of flying school, we fell a little short of our end-year objective of 3,700 pilots but I regard the pilot situation, over-all, as a very healthy one.

From an aircraft standpoint, the composition of the Air National Guard inventory improved greatly during fiscal year 1956. F-94C aircraft were for the first time assigned to Air Guard units as were the RF-84F aircraft, direct from production. The number of F-86Es was increased and there were other increases among our later model jets—mostly all-weather aircraft. These aircraft replaced F-51s phased out of the program. As of the end of the year, we had a total of 1,476 jet aircraft assigned, 200 more than we had one year ago. Allow me a moment to mention the F-94C. This is the first rocket firing aircraft to enter our inventory and two of our squadrons are now being re-equipped with these aircraft. Their ability to carry and fire air-to-air rockets greatly increases the effective fire power that can be brought to bear upon a high flying intruder aircraft. We welcome the advent of this type aircraft to the Air National Guard inventory. On this score, we are also looking forward to the receipt of our first F-86Ds. We should receive a sufficient number of these aircraft to equip one test squaddon during the first quarter of this fiscal year and a second squadron during the third quarter. We look upon the receipt of these aircraft as a challenge to our aircrews and maintenance personnel, but I am convinced that our units will demonstrate the capability to effectively operate and maintain them. We were confronted with much the same problem when we first received F-89s. Our utilization and maintenance of these aircraft have climbed steadily since the inception of the program to retrofit them with newer engines and we are quite pleased with the progress that has been made with these aircraft. I am certain that we will make the same great progress with the F-86D.

From an aircraft operations standpoint, the Air National Guard made considerable progress last year in reducing its over-all accident rate as well as its jet accident rate. The trend is encouraging but our units, because of the advent of newer, higher performance aircraft, are doubling their efforts in an intensified accident-prevention program. Continental Air Command and the numbered air forces are assisting our units in that they are establishing positive programs to increase the pilot proficiency and thereby lower our accident rate. We in the Guard appreciate the increased interest that Continental Air Command and the numbered air forces are placing on their responsibiltiy for supervision of training and inspection of the Air National Guard units. Although the present accident rate is not too much out of line with comparable commands, we regard it as still too high. I believe, however, that the recently authorized increase in flying periods will inevitably bring about an increase in flying proficiency and a consequent decrease in the aircraft accidents.

The additional flying periods I have made reference to here are, as you are no doubt aware, the thirty-six extra flying training periods authorized for Air National Guard aircrews. These extra training periods were the minimum necessary to enable our aircrews to meet their flying training requirements. These periods are not classed as unit training assemblies but sufficient aircrews must be scheduled simultaneously to insure effective training in accordance with Continental Air Command training directives. The training period will be of four hours' duration and will include at least one and one-quarter hours of flight training for jet crews, and two and one-half hours for conventional crews. This program, I am sure, will increase aircraft utilization, increase pilot proficiency, reduce accidents, and increase over-all effectiveness of our units and personnel.

In the installation area, we were able to start construction lengthening additional runways and providing squadrons with new facilities, to meet our phased requirement. This construction will enable squadrons to operate their jet aircraft as they are assigned. The solution of the problems of these squadrons leaves us in a position where we are almost certain all operational facilities required by the Air National Guard will be in place or under construction by the end of fiscal year 1957.

Among the major organizational changes which occurred last year was the reorganization of eight of our fighter-interceptor squadrons to all-weather operations. Eight of our twenty-three fighter wings and twenty-four of our seventy-three fighter squadrons now have an all-weather mission. As I mentioned earlier, these eight wings have been reorganized to conform to the Air Defense Group structure consistent with our policy of paralleling, where possible, the structures of like-type units of the regular Air Force. Under this reorganization, the Fighter-Interceptor Wing Headquarters are retained but as Air Defense Wing Headquarters. The major change occurs at those bases which previously had either an augmented squadron, or a squadron together with its wing-base support units. In their stead, there is authorized a Fighter Group (Air Defense) composed of a Group Headquarters, a Materiel Squadron, an Air Base Squadron, and an Infirmary, in addition to the tactical squadron or tactical squadrons on the base. In some instances, the reorganization means an increase in personnel; in other instances, it means a decrease. Reorganizations will continue to take place from time to time consistent with USAF's ability to provide all-weather aircraft and the program under current planning will be completed in about three years. It adds about 8,000 personnel to the ultimate authorized strength of the Air National Guard, increasing this strength from 83,000 to 91,000.

No report to you would be complete without mention of our Air Alert Program. You know, I mention this program at every opportunity because it is one of which we are quite proud. The operation has been very successful from the start and, with the advent of higher performance jet aircraft into our inventory, it will reach a new high. We recently added two units to this program, giving us a total of nineteen units, all located in areas determined by Air Defense Command to be strategically suited to current defense planning. Last year we had an average of 280 pilots per month participate in this program and 100 percent of the tactical pilots of the participating squadrons were rotated through the eighty-five pilot spaces involved. Our pilots today are flying over 1,600 combat ready hours per month under Air Defense Command control, and they are accomplishing a comparable number of intercepts. They are being scrambled an average of thirty-six times a day with seldom a delay. The delayed request rate is less than one percent—seven-tenths of one percent to be exact. Our abort rate is about three percent. There is no question in my mind about the value of this training. I'm convinced it is giving our units the opportunity to attain a proficiency of operation

which cannot be met any other way, and I am certain that Air Defense Command is well satisfied with the program as a whole.

Before concluding, I want to briefly cover our schools program. Aside from flight training, the Air National Guard is making extensive use of its available schools, about sixty percent of the schools available to the Air Force. Our basic training program is a good example of the emphasis being placed on school training. This summer we have a requirement for approximately 4,700 spaces—2,700 at Lackland and 2,000 at Sheppard. By October, all of these men will be ready for specialist training in their respective career fields. Two years ago, basic airmen represented about twenty-five percent of the enlisted strength of the Air National Guard. Today, it is less than half that, due in large measure to the speed with which we have been able, through our school program, to get the basic into career training. The units for the most part are completely sold on this program and more and more of them are accepting enlistees only on condition they agree to undergo this training. Over-all, our training program has been quite effective and today better than fifty percent of our personnel are fully qualified and operationally ready in their duty AFSCs. Our reenlistment rate is up, our attrition rate is down, and consequently we are retaining from year to year an increasing percentage of our trained personnel, which is a very healthy situation.

This fiscal year, our personnel program calls for an end-year strength of 7,900 officers, including 4,230 pilots, and 60,300 airmen. We are programmed to have 2,000 tactical aircraft, including 1,820 jets, an increase of approximately 350 jets over our present inventory. The composition of our aircraft inventory will continue to improve and we look for a substantial increase this year in the combat capability of the Air National Guard. —End

What's Ahead for Reservists and Air Guardsmen?

Lt. Gen. Charles B. Stone III
COMMANDER, CONTINENTAL AIR COMMAND

LT. GEN. CHARLES B. STONE III *General Stone, Commander of the Continental Air Command, Mitchel AFB, N. Y., was born in Georgia in 1904. He was graduated from West Point in 1927 and from flying school in 1930. During World War II he went to China to organize headquarters for the Fourteenth AF (Flying Tigers), and then assumed command of it later. He became Deputy Chief of Staff, Comptroller in 1951 and assumed his present position in 1955. He is a command pilot and an aircraft observer.*

IN MAKING the "ConAC Report," rather than touching on those things we are doing, I would like to use this opportunity to speak to you of some of the things we are thinking about. I would like to use this Reserve Forces Seminar as a sounding board for some new ideas pertaining to the utilization of Reserve forces of the future.

My headquarters is busy in thinking about the period from 1960 on. Both General Hall and I intend to convene a Board of Officers composed of Regular, National Guard, and Air Reserves to look at the capabilities of the Reserves in the light of problems facing the Air Force in its determination to meet its responsibilities in furthering national objectives.

All of us in the Air Force realize that we are playing "for keeps." On the one hand we know we have an aggressive aggressor who doesn't like the way we do business and plans to do us under. On the other hand we know he fears the unique capability of Americans in this Airpower Age.

We feel optimistic that we have and are developing weapon systems which can knock out any kind of target, big war or fringe. We recognize that war

(Continued on following page)

is a nasty business and that to carry out the national objectives it is our job to create those forces and that attitude which can bring to bear the sort of destruction which will keep the peace.

In the light of this serious business confronting us and in view of the vastly increased cost of weapon systems and the training of individuals to operate these systems, we have to use everything we have effectively.

Our Reserves for the most part represent a manpower pool of experienced individuals expensively trained by the Air Force. Many are engaged in civilian skills of immediate application to their military jobs.

In one unit on two weeks' field duty I recently visited, I walked into a machine shop. There were four machinists on duty making a new T-Bird tow-target reel. All of these fellows in civilian life were tool and die makers. All are volunteers, like the Air Force and take pride in service to our country. Many of the younger fellows enlist in the Regular Air Force after brief period of experience with a Reserve unit.

I am convinced in this era when the civilian population, as well as the military, may be subject simultaneously to the horrors of war, that the Reservist has a new and realistic attitude about the part he can play in the defense of our country.

He wants to use his training, already paid for, on a part-time basis to be vitally useful. We in the Air Force feel our first priority job is to be decisively effective on D-Day and the period immediately following. How then can we best employ the Reservist in the period immediately ahead—1960 on?

In thinking of this problem one has to take a look at the typical Reservist himself—who is this fellow? Most of our key people in the Reserve forces are veterans. They are men of considerable combat or administrative experience.

Last week I visited two units on their two weeks' summer encampments. At the 108th Fighter-Interceptor Wing summer encampment at Otis Air Force Base, I was shown around by Col. Don Strait. Everyone here knows that Don is a World War II fighter ace and has been active in the National Guard program ever since his discharge, except during the Korean emergency, when he commanded a fighter-bomber group.

He has a fine unit equipped with F-86Es. His pilots were actively engaged in gunnery exercises. They were handling jets easily but carefully, with considerable attention to accident prevention.

His ground personnel presented a scene of orderly activity, testing aircraft components, loading guns, doing all necessary to get the aircraft off on schedule. Minor engine discrepancies forced the pulling, repairing, and replacement of ten jet engines. All this work and training was taken in stride by this efficient organization.

Over at Clinton County, the 459th Troop Carrier Wing (the "Congressional Wing") from Andrews Air Force Base was in training. When I got there one squadron of the unit was airborne in C-46s, engaged in a massed precision aerial drop.

Col. Ramsey Potts, the commander, had his ground maintenance personnel organized into three shifts, working around the clock keeping his aircraft in commission. He also was right on his intensive training schedule.

As we know, Ramsey Potts had a distinguished World War II record. He lead a group on the Ploesti raids. Ramsey in civilian life is a lawyer but he keeps up with his military duties and has a unit which can be relied upon to be useful on D-Day.

Strait and Potts happened to be commanders of the only two units I visited last week. We have many other fine National Guard and Air Reserve unit commanders of like caliber.

Well, the average individual Reservist is a businessman or in one of the civil professions—lawyer, CPA, doctor. He likes the Air Force, he likes to participate in its training.

If he is in a Category A unit in the National Guard or Air Reserve, he engages in forty-eight periods and two weeks of active duty. If he is a pilot or a member of a flying crew, he has thirty-six additional drill periods, making an equivalent total for the aircrew types of approximately ninety-nine days' duty a year.

All of these days are working days for which this typical fellow receives federal compensation in terms of pay commensurate with rank and rating. The other 266 days this typical Reservist is engaged in his civilian occupation.

If he is in the individual Mobilization Training Program, and we have a need for about 110,000, he participates in from fifteen days of active duty to forty-eight inactive-duty periods, plus the fifteen days of active duty, annually. The MDs, lawyers, and civilian professional types usually only take the fifteen days' training, while the rated, administrative, and technical types participate in the more frequent training schedules.

There is a great deal of talent amongst the Reserves. There is an outstanding willingness to play the Air Force game. As I increase my experience with Reservists, my appreciation for their capabilities and admiration for their spirit mounts with each passing day.

Now then, what to do about this talent in the future in the light of the serious business facing the Air Force. I am not at all convinced at the moment that we are gearing our thinking and planning to making the maximum contribution.

The group that General Hall and I intend to get together from the Air National Guard, the Air Reserves, and from the Regular Air Force, will take a cold, hard look at the capability of the typical Reservist, the substantial reservoir of veterans who are and will be available, and of young men who are interested in contributing to the United States Air Force in a Reserve capacity.

We hope to uncover functions which the Air Reserve and National Guard can do to live up to the concept of a vital D-Day ready component of the United States Air Force. Personally, I think that the concept of second-line equipment to the Reserves is OK for today's D-Day Reserve mission.

On the other hand, in this age of very expensive weapon systems and training incident to their use, we should not overlook the possibility of Reservists' manning new weapon systems, thus permitting the Regular Air Force to concentrate on those systems not at all practical for the part-time airman.

Take a typical Reserve tactical type unit of the future as we see it. Not only will there be available veterans with Air Force experience, but also many whose civilian occupations fit right into military performances.

Also, we believe we will have a hard core of full-time duty Reservists, both in the Air Reserve as well as the Air National Guard, employed on a civil status during the week and on a military inactive-duty status during drill periods. These individuals, about twenty percent of each unit, will have very little turnover, will live in the community, and should be in all respects a very stable, highly skilled group of working technicians and administrators.

It seems to me that a typical Reserve unit with this hard-core, skilled technician group and with volunteers agreeing to participate in scheduled

(Continued on page 160)

Temco's new jet wins Navy Wings

The U. S. Navy has selected Temco Aircraft's sleek Model 51 as its first jet primary trainer. Filling its role in a new concept for primary training, the two-place aircraft will give Navy pilots of the future flight training that actually begins in a jet.

Designed, built and flight-tested by Temco at its own expense, the Model 51 now becomes the Navy's TT-1, after its selection in competitive flight evaluation tests at the Navy's Patuxent River Air Test Center.

The TT-1, basically designed to shorten the number of flying hours for military flight training, combines the flight characteristics of true jet performance with the safety features that student pilots need.

ENGINEERS

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drill periods and two weeks of summer training, would be an ideal unit to operate some of the near population centers missile sites of the future.

One can hear the fly boys groaning at this sort of thinking. They want to continue to man the cockpits, and I believe they should on a carefully selected basis. Particularly if there is a need for a manned aircraft type to fit into a D-Day role, or some other war plan of the United States Air Force. But I believe this should be the criteria, not influenced in any way by the foreseeable availability of second-line aircraft.

If more and more cargo airlift is a continuing requirement in the Air Age, and I believe it is, there is no question in my mind but that the Reserves, both the Air Reserve and Air National Guard, can do a good job. They are doing well today.

Equipped with C-119s and C-46s, the troop carrier units of the Air Reserve have been running a mission into the Caribbean carrying Coast Guard supplies to down-the-range guided missile installations.

As of the end of July a total of eighty-seven missions have been flown and 431,500 pounds have been delivered without any sweat at all. We are halfway through this operation scheduled to deliver 900,000 pounds.

In the meantime, these troop carrier units are engaged in their normal summer encampment tactical exercises. I feel we are losing a bet in our determination to have the Reserves more useful by not having more airlift capabilities in our Reserve forces.

In any event, these are the sort of things that we are looking at, all with the idea of affording an opportunity for the maximum contribution of trained, highly motivated civilian-military types, who are eager to fit into the Air Force program on the basis of being vitally useful.

There is still another matter somewhat relating to the employment of the Reserves which I would like to discuss with this group. This matter pertains to a name. The big responsibility of ConAC, the Continental Air Command, as you know is the administration and training of the Air Reservist and the supervision of training of the Air National Guardsman.

The designation of ConAC does not portray this primary duty of my command. Frequently my command's operation is confused with General "Pat" Partridge's ConAD. I don't in the least object to this, nor does Pat.

Actually the fighter-interceptor types of the National Guard, and there are twenty-three wings, and the nine fighter-bomber wings of the Air Reserve for which ConAC has training responsibility, either do or will tie into the Air Defense system. So in a sense we do participate in the ConAD.

But I do feel somewhat like the head of a firm—who got a call one day—"Is this Peabody, Finchley, Longworth, and Fitzgerald?" "Yes, this is Peabody, Finchley, Longworth, and Fitzgerald." "I want to speak to Mr. Smith."

All of us in my headquarters and in the headquarters of the numbered Air Forces are proud of the fact that our primary mission has to do with our Reserve forces. I am thinking seriously of proposing to the Chief of Staff that he redesignate our command as the Air Reserve Forces Command. I think this redesignation is highly symbolic of our primary mission and will give the Air Reservists, both the National Guardsman and Air Force Reservist, a feeling of better participation in the airpower picture.—END

Industry's Responsibility to the Reserve Program

L. R. Boulware

VICE PRESIDENT, PUBLIC AND EMPLOYEE RELATIONS, GENERAL ELECTRIC CO.

IT IS A privilege to participate in this discussion of the Air Force problem of getting and keeping trained manpower.

For what comfort it may be to you gentlemen, this trained manpower problem is one the Air Force has in common with those of us in industry who are involved in rapidly advancing technology. Industry as a whole is trying to provide a forty percent increase in output in the next ten years with only a fourteen percent over-all available increase in the manpower. At General Electric our particular problem appears to be that we must double our volume in the next six years. Obviously vastly more

L. R. BOULWARE

Mr. Boulware is vice president, public and employee relations services, General Electric Co. He was born in Kentucky and was graduated from the University of Wisconsin in 1916. He served in various executive positions in industry before joining GE in 1945.

trained manpower has to be created to transfer to machines the work human effort would otherwise have to do.

To the Air Force and its Reserve this is a dual problem to a degree not found even in industry. The manpower needed currently must, as in industry, have been somehow recruited, trained, and made available on the job in adequate numbers. But, to a degree far beyond anything encountered in industry, the vast further supply of trained manpower—needed for some possible future emergency of unknown proportions—must also somehow be attracted, trained, and kept rather promptly available.

If our experience in industry is any criterion, the things that make a voluntary connection with an employer attractive are these nine:

1. Good pay and other material benefits.
2. Good working conditions.
3. Good bosses.
4. A fair chance to get ahead.
5. Steady work.
6. Respectful treatment.
7. Full information as to what's going on.
8. Important and significant work.
9. Rewarding association on the job.

Since the Air Force and its Reserve are in competition with those providing other voluntary job opportunities and with the other services, the aim will doubtless have to be to offer as many as possible of the above ingredients and to try to make up in some where there is any lack in others.

It is very stimulating and encouraging for us citizens to note the warm attention the armed services are giving these considerations. For instance, as you may know, a Defense Advisory Committee on Professional and Technical Compensation is now at work, and we are proud that our Mr. Ralph J. Cordiner, President of General Electric, is the chairman of that committee. The strong heart of the Air Force is its core of dedicated people. But we certainly do not want their dedication to the defense needs of their and our country to be at the expense of either the basic material reward or the extra human satisfactions which all people want from their work.

But when you gentlemen of the Air Force and its Reserve, for instance, have done all you can to attract, train, and keep the personnel you want, the question then arises as to what the rest of us can do, what we should do as citizens to help.

In this matter, as in all others at General Electric, we are constantly trying to find out anew what is the right thing for us to do, and then be sure we do our level best to do it. Obviously, the doing of our full part in national defense is an important consideration in measuring up to the over-all responsibilities imposed on us by the public's patronage. Here, for instance, is what General Electric is doing and trying to do in what I judge are the particular areas of interest in today's discussion.

1. We employ people without prejudice as to their military status. We employ those in the ROTC, in the Reserve, or others likely to be drafted or recalled to service. Something like twenty-two or twenty-three percent of the men we employ are in the ROTC today. A qualified man we want may be put on the payroll even if it is only one day before he goes on active duty.

2. Those on our payroll have full opportunity for advancement to more responsible jobs without regard to immediate or future liability to military service. In other words, we accept military service as a part of our way of life and we try to live with it. We think that's a part of our job as much as it is a part of yours.

3. We try to help employees freely fulfill their obligated service, and endeavor to make the transition as easy as possible for them and their families. We let them come and go into the services with as little disruption as possible to their lives, consonant with their General Electric careers.

When a man goes on extended active duty, we give him a military bonus of a month's pay where he has had a year's service. We make life insurance coverage available—for a period of 120 days until service insurance takes effect. We have a provision for medical coverage of dependents under our company insurance plan, which the man may take out if he wishes. We also give him service credits for his period on active duty, determining when he can go on pension and things of that kind. We give the difference between his General Electric pay and his base military pay for his two weeks' annual training period. We allow differential payments for an additional period of up to seven days for Reservists ordered to take pre-induction physical or to present a deferment request. Our general practice has been to allow—within the discretion of the man's immediate manager—time off for military training in addition to vacation. Some of the people wish to telescope them, and do, but in general they like them separate.

Recently—in the light of the Reserve Forces Act of 1955—we have been considering extending our practice of paying the difference between his military pay for annual training from two weeks to seventeen days and extending it even to thirty days in specific cases where the employee failed to meet the drill program requirements for company reasons and applying the training differential to the first seventeen days for those who enter into the new training of three to six months under the terms of the Reserve Forces Act. The present military service bonus of one month's pay is continued for those going into extended active military duty.

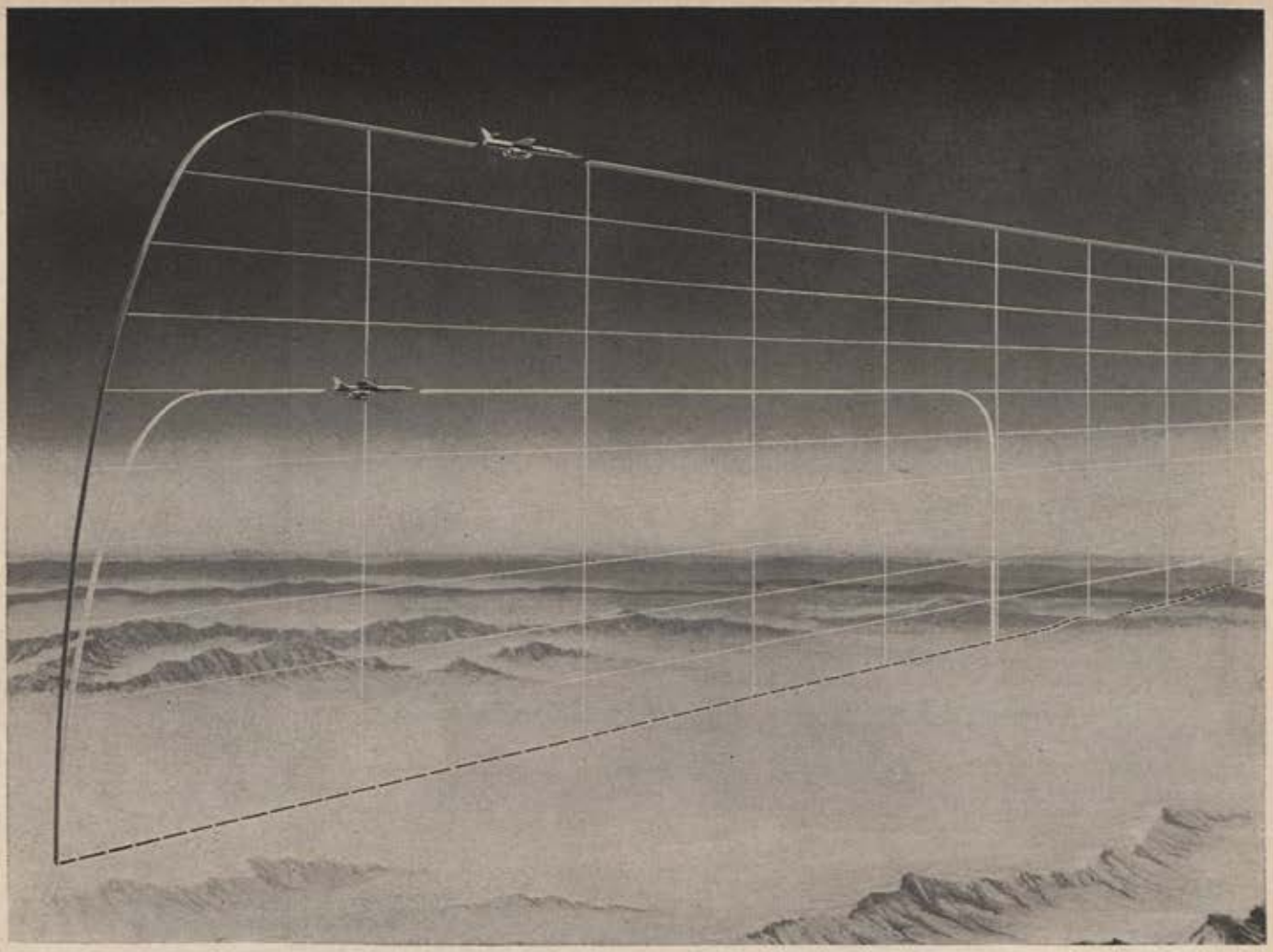
On returning from active duty we try in every way to fit the employee into his old job, or a new and better one for which he has meanwhile become qualified, or to such available job as is best suited to him. In other words, we try—within the balanced best interests of all concerned—to avoid any lessening of career prospects because of military service.

4. We try not to put any undue pressure on our former employees to leave the service and return to us ahead of their own voluntary decision to do so. We do not try to lure others away from the services. But we would hope, of course, that other General Electric men are pretty good ambassadors.

Yet we, in general, like to have our old employees back just as soon as they want to come. And we like to provide good opportunities for career men who have been retired early from the service and who are fitted by knowledge and experience to make a contribution to special civilian or defense projects.

Meanwhile, it is only natural that trained military personnel—both those who have and have not been on our payroll—will become aware of our advertising and other search for the extra manpower we need in certain categories over and beyond what we can supply by our current training and up-grading programs. This must further inescapably complicate, to some small degree, the problem that Air Force and its Reserve have of holding the trained manpower desired. But, despite General Electric's great need of scientists, engineers, and other trained manpower to meet

(Continued on page 163)



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the demands of the civilian and military buyers—for instance, we'll take 1,800 engineering graduates this year from colleges—we are trying to have each manager employ only those recruiting practices which he would consider ethical when used by others to try to employ his men. We are furthermore trying to confine our recruiting, if at all possible, to those individuals who themselves take the first step in seeking employment with General Electric.

Having thus done what we can to try to help the Air Force and its Reserve get and keep the people desired, we can think of only one more form of help we might propose. That's in the area of trained manpower utilization.

As in all cases where everything has been done for the moment to increase a short supply, there is the urgent necessity here for optimum utilization of what supply of trained manpower there is—with accompanying ingenuity in devising ways of getting the rest of the job done by alternate expedients.

I am sure the Air Force is having to do all the usual things the rest of us are doing—such as trying to see that a metallurgist is not doing drafting or bookkeeping but has been relieved of all lesser responsibilities than those which really challenge his top mental capabilities.

But in a field like maintenance, for instance, there might be the opportunity for concentrating the Air Force's own skeleton peacetime maintenance personnel on that work which, from a time and location and training standpoint, it was necessary for them to do themselves. Then the bulk of the overhaul work might be done by the original manufacturer at his plants or permanent service shops and with the help of his many component makers. This would do three things:

1. It would help solve the Air Force's present critical peacetime trained manpower problem.

2. It would enable the manufacturer to pass a lot of employees through the maintenance work and thus develop a very large "ready reserve" who would have the technical knowledge and skills, who have developed this know-how while living normally at home, but who would be available for field work in the event of an emergency.

3. It would advance technology and reliability by close association of corrective and other overhaul work with design engineers, manufacturing management, inspectors, etc.

When we consider this or any of the other aid which industry can give to the armed forces in peacetime, we all have before us the hard economic and moral fact that our obligations are just as great as our opportunities. American industry constitutes a tremendous "active and ready reserve" which, paradoxically, is maintained in size and strength largely by the preference that civilian buyers give our offerings in the civilian market place. The bigger that civilian preference for any one of us, the bigger is our military obligation—because of the variety of knowledge and skills the public has made it possible for us to acquire and support in our pursuit of pleasing people their way.

General Electric has been the recipient over the years of unusual response of civilian and military buyers to our offerings. We would, in turn, want to do our duty in any case. Fortunately, trying our hardest to do our duty by the Air Force doesn't come hard. And I'm hoping to learn in these discussions here how better we may serve the Air Force in this particular area of its interest and still be operating in the balanced best interests of all concerned as civilian consumers, workers, savers and investors, suppliers and distribution folk, and otherwise as citizens of our great and privileged country.—END

Community Relations Can Be Licked

Brig. Gen. Robert L. Scott

FORMERLY DIRECTOR OF INFORMATION SERVICES, USAF

IT IS impossible, I believe, to overemphasize the important role our Air Reserve forces play in our nation's security. The Air Force is extremely pleased with the outstanding progress the Reserve forces have made in the past two or three years and we are indeed grateful for the manner in which you people consistently participate in training programs in order to improve your combat capability in time of war. We know that, to have effective Air Reserve forces, we must also have the complete recognition and support of the general public. As Director of Information Services, I am determined to do everything possible to attain this necessary public recognition and support of our Reserve components.

Information Services is a broad and highly complex business, and I could never begin to tell you about it in the

(Continued on following page)

time allotted me. Today, therefore, I will confine myself to one important element of our many-sided job—community relations.

To the Air Force, community relations means the relationship between our own Air Force people and those of the civilian communities adjacent to our bases. Because this part of the information business deals with the relationship between people, there are almost as many problems as there are people or groups of people.

The difficulties that occur between communities and air base operations are not simply an Air Force problem. Actually, it affects national politics and the national economy as well as national defense. It applies to the civilian populace, to the Congress, to the other armed forces, to civilian air commerce and to industry as well as the Air Force.

In terms of dollars and time, as far as the Air Force is concerned, it is estimated that it would cost nearly three billion dollars to close and relocate all of the bases which have this problem. The Air Force—and the nation—can afford neither the time nor the money to do this.

To tie in this over-all time and dollar cost factor to the local situation, let me give you an example of what this problem can do to our national security program. During Air National Guard readiness alert exercises last spring, one Middle Western unit was grounded because of an injunction filed by an angry citizen who lived adjacent to the base. The unit lost valuable training time and experience, and its forced inactivity left a dangerous crack in our air defense fortress.

As far as the reduction of noise is concerned—and this is one of our main problems—we are doing reasonably well on the ground. In the air, it's another story. Optimistic press stories would have you believe that adequate noise control for jet engines in flight is just around the corner. The extent to which this optimism is justified has not been made clear to the public. Many methods of suppressing jet engine noise have been and are being investigated. So far, however, no device suppressing noise has been flight-tested. Some very promising devices are being ground-tested. All of these devices result in a loss of thrust output, a situation which makes them unacceptable to us. So the experimentation continues.

As for real estate actions, a similar contrast of success and failure is evident. In many communities we have been successful in establishing zoning statutes to prevent community encroachment on the boundaries of our bases. In many others our efforts have met with concerted opposition and failure.

Today, we know that if we are forced to fight, we would have to stand or fall with the military strength we had in being or combat-ready in our Reserves at the start of hostilities. *All our units*—active, Reserve and National Guard—must be kept in a state of ever-improving effectiveness unhampered by limitations imposed by a poorly-informed public.

This is the problem area where we need help. The joint-use airports are those where our Reserve, Air National Guard, and air defense units are located. It is important to understand that the Air Force has been charged with responsibility for development and maintenance of the most qualitatively superior air forces human endeavor and scientific genius can produce as the best deterrent to war.

A firm program, identified as the 137-wing program (active) and fifty-one Reserve forces wings, has been designed to fulfill that responsibility. Every existing installation is vital to the success of that program. Every existing installation which is either closed or given up with an attendant requirement for construction of a new equivalent facility, means that the program is delayed by whatever time is consumed in that process. And the Reserve and Air National Guard units and installations are just as vital a part of the program as any other unit.

The inevitable suggestion in these cases is that the Air Force should gather up its "jet birds" and move to a new location. Believe me, there is never any shortage of suggested locations. And, of course, they all claim that each location "can be turned into a magnificent airfield at minimum expense." What the backers of this action forget—or don't know—is that the total cost of such a move would probably bankrupt the country.

The multi-million dollar cost of each new installation is compounded by the lost investment in abandoned facilities. Further, the proposal that air bases be built in so-called isolated areas is completely impractical. Picture what happens when the Air Force decides to build one of these multi-million dollar installations in any given location. Unless early action is taken in the form of actual land acquisition supported by extensive restrictive zoning, a community inevitably springs up around the new installation—a community which will someday house potential complainants about the Air Force.

Everyone of us here is a firm believer in airpower. Otherwise we wouldn't be here. Our job is clear. If we are to convince the American people that this is no time for horse-and-buggy thinking, we must first make sure that we have the forward look ourselves.

The Wright Brothers didn't get off the ground only because they built a workable airplane. I'll admit the airplane helped, but they flew because they were able to shake off the shackles of day-to-day thinking and look upward and ahead.

As believers in airpower, we must convince the American people to think ahead, too. There's one thing we know for sure—we don't have to *sell* airpower. What we have to do is convince the American people of the *need for airpower right now.*

As members of the Air Reserve and Air National Guard, you can help the Air Force tremendously in solving its community relations problems. Community relations is a vitally important aspect in our struggle to maintain the best possible Air Force. This problem exists because people simply don't understand the *need*—the *immediate* need for airpower.

A short time ago I was informed that leading radio and television personalities in some of our larger metropolitan areas had been wanting to talk about the role our Air Reserve forces play in our national defense. However, even though we had Reserve forces units in these particular localities, no effort had been made by Reserve forces commanders to provide information to these people which could be readily used on their programs. This problem of community relations is one that affects you directly. You cannot expect media people to talk about your product if you don't first provide these people with material to talk about. If, in any given area, we find a difficult community relations problem, we look first to our active-duty and Reserve forces commanders to determine just what they have done to correct the situation. In the field, Air Force com-

BRIG. GEN. ROBERT L. SCOTT
General Scott, Director of AF Information Services at the time of this speech, has been reassigned (see page 22). A well-known author, he was born in Georgia and is a 1932 graduate of West Point. He has flown 388 combat missions as a command pilot.

munity relations begin with commanders from wing level on down. If a unit commander does not recognize or accept his responsibilities in this direction, then he must—for the most part—bear the brunt of adverse community relations.

You know as well as I do that they are continually trying to relocate Air Force operations, especially the joint-use airports which ADC shares with civil airlines. The Air Force is necessarily widely dispersed across the nation. It *has* to be that way because we can't expect to provide adequate aerial defense of New England, for instance, with fighter craft based in the Arizona desert. But there are plenty of people who don't understand why we can't put all of our jets out there where they won't bother anybody with their noise.

We've had trouble in Wisconsin, trouble in Chicago, trouble in New York, trouble in Minnesota. You name it—wherever it is, there is someone yelling at us to pack up our "jet birds" and get lost. These people want defense—*without inconvenience*. On one hand they complain of jet noise and large base populations that overflow into their communities. But, on the other hand, if you ask them if they want adequate aerial defense, they are the first ones to shout: "Of course we do! What are we paying taxes for?"

As supporters of airpower, every one of you holds a unique position in his community. Your fellow citizens and friends value and respect your opinion on airpower and national defense. Because you are members of the Reserve and Air National Guard, your words carry conviction and authority.

You are a respected force in your communities across the nation. Since the need for public understanding is so great, you must speak up at every opportunity on matters of airpower and national defense.

Share your knowledge and convictions with others. Tell them! "This is *your* Air Force. It has to be the best—right now!" There are thousands and thousands of thinking Americans—who will make any sacrifices for national defense if in return they are only given the truth.

These are the people to whom you believers in airpower must bring the story. The decision they make will mean the difference between security and the loss of the freedoms we hold so dear.—END

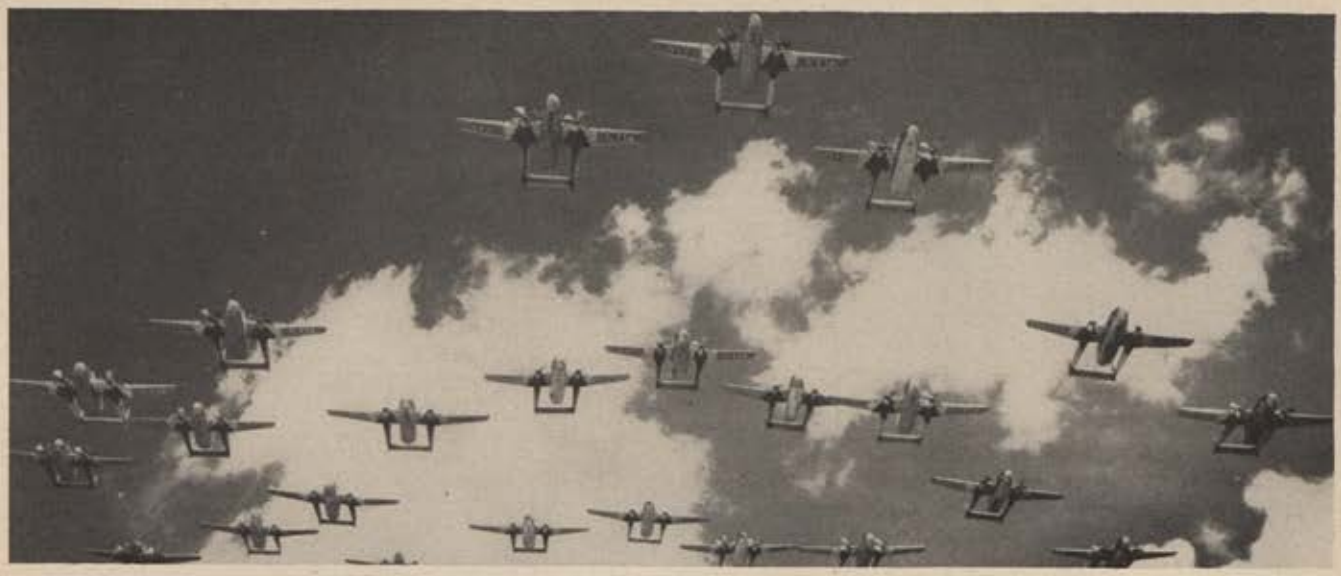
How Tactical Air Command Plans to Use Its Reserve Units

Gen. O. P. Weyland
COMMANDER, TACTICAL AIR COMMAND

UP TO this point, we have been briefed on the Reserve Forces program from the higher level; now we are down to the "consumer" or "user" level. I think I'd better not

(Continued on following page)

GEN. O. P. WEYLAND
General Weyland is Commander of the Tactical Air Command, Langley AFB, Va. He was born in California, was graduated from Texas A&M in 1923 and received his wings in 1925. During World War II he commanded the Nineteenth Tactical Air Command and in 1945 he was Commander of the Ninth AF. During the Korean war he headed the Far East Air Force.



C-119s flying over Sewart AFB, Tenn. In an emergency, Reserve troop carrier wings would be integrated into TAC.

use the word "consumer" because it is a word with such a definite finality. However, as a "user" of the product of the Reserve forces program, I cannot overemphasize the personal satisfaction I have obtained from noting the tremendous progress of our Reserve forces during the past few years.

I know you are all familiar with this program and that many of you are commanders and members of Reserve forces units. You surely recall the instability of planning that existed following World War II. In less than six years the regular Air Force was required to change its programming at no less than seven varying levels. First it was sixty-six wings, then fifty-five, then forty-eight, then ninety-five, then 143, then 120, and finally 137 wings, where it has stablized for the past three years. During this period of fluctuation, thousands of man-years of effort were expended on administration and planning details that could have been more profitably used in building up airpower. This stop-and-go planning reminds me of a game of "crack-the-whip" on ice skates. The anchor man and those near him do receive some reaction of the movement and stopping or cracking of the whip, but nowhere near the magnified impact on that poor individual way out on the end of the line. As you well know, during this stop-and-go period, you and TAC, side by side, at the end of that whip really took a beating.

Today the whip has stopped cracking and is stretched out in a straight line with all of us pulling together toward a mutual goal. Our planning has stabilized and our goal is the 137 wing program. This stability of planning is reflected in the Reserve forces program. At headquarters USAF, the Air Staff has studied our wartime requirements in light of a general war being initiated against the United States. They have decided that the minimum immediate requirement of a Reserve force to back up the Regular Air Force is fifty-one combat wings plus a proportionate number of critical type support elements of group and squadron size, as well as many thousand individual specialists. Mission-wise this fifty-one wing force has been split approximately in half, one-half being given an air defense role, while the other half will augment my tactical warfare capability. The Air Staff has allotted TAC twenty-eight of the fifty-one Reserve and Air National Guard combat wings for wartime utilization. Air Defense Command will receive the balance of the wings.

A total of nineteen of those combat wings and four tactical groups have an *immediate* mobilization assignment with TAC. This includes:

- Thirteen troop carrier wings,
- Four tactical bombardment wings,
- Two tactical reconnaissance wings, and
- Four air resupply groups.

Also immediately available to augment tactical air are many support units including:

- Three tactical control groups,
- Three communications groups, and
- Nine aerial port squadrons.

Add to this 11,000 individuals undergoing specialized training and the Reserve forces authorized to TAC, when the balloon goes up, comes to a strength of over 65,000 people. This means that in event of mobilization TAC would just about double in size overnight.

Until recently we had an additional nine Reserve fighter-bomber wings on mobilization assignment to TAC. They have now been assigned to Air Defense Command for an initial D-Day role of air defense, but will be promptly reassigned to and employed by TAC at such time after D-Day as Air Defense Command determines that they can spare these forces. Some of these units have served under me in past campaigns. I, therefore, feel that I at least have a residual proprietary claim to them and will continue to consider them in my planning. In fact, I am presently on a tour visiting some of our Reserve forces on active duty and have just completed a visit to two of these fighter-bomber wings.

To train, equip, and administer to a force of over 65,000 men scattered from coast to coast is a tremendous task and, as you know, is the responsibility of Continental Air Command. I would like to make it clear that our responsibility in TAC is purely in an advisory capacity. This is further limited to a "training" advisory responsibility. TAC discharges this training responsibility in a few very simple steps.

First is command support. Every echelon of my command is strongly behind the Reserve program.

Second, section 252 of the Armed Forces Act of 1952 provides for the assignment of senior staff officers to monitor all Reserve component affairs at headquarters USAF and at various major command levels. At headquar-

(Continued on page 168)

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Three of the six Reserve Forces Seminar speakers talk over program. From left: Lt. Gen. Charles B. Stone III, Commander of the Continental Air Command; Maj. Gen. Winston P. Wilson, Chief of the Air Force Division, National Guard Bureau; and Gen. O. P. Weyland, Commander of the Tactical Air Command.

ters TAC our Reserve components staff is fully manned and highly active. The head of that staff has been with me on that trip I just mentioned. In addition, we have similar staff sections at both Ninth and Eighteenth Air Forces. Primarily these officers assist and advise the commander and staff in the preparation of plans, programs, policy, and directives pertaining to the Reserve components.

Third, although Continental Air Command is the responsible agency, we provide technical assistance to them in the preparation of training directives. Further, we periodically review these directives and submit recommendations for changes to Continental Air Command. In this manner we are assured that the training for the Reserve component is aligned with the tactics and techniques employed by its Regular air force counterpart.

Fourth, we recommend to Continental Air Command specific training objectives for the various units to achieve on their annual fifteen-day active-duty training tour. Upon approval by Continental Air Command of these objectives, we then assist in preparing a detailed training plan outlining to the Reserve unit commander the steps to be taken to attain those objectives.

Fifth, we maintain personal contact with the Reserve unit to assist and advise in training matters. This is done by an "Advisory Unit System" which simply means we appoint a like-type Regular unit as the parent or advisory unit to a Reserve component wing. In turn, each of the advisory units appoints an advisory team composed of specialists whose duty is to visit the Reserve unit throughout the year during week-end training periods. Assistance and advice is offered on training matters. Recommendations on matters other than training are made *informally* to the unit commander or *formally* through channels to Continental Air Command.

I should like to digress at this point for a moment and mention a few facts concerning my advisory teams. I am not given additional manpower for these teams. They conduct this responsibility as an additional duty. Because of the nature of the assignment; that is, being advisors; they must necessarily be selected from the best that the advisory wing can offer. Naturally the demands on these top-notch people in their primary duty alone is quite heavy. It all boils down to the fact that most men must give up their own time to make a week-end visit to the Reserve recipient unit. Compensatory time off in many cases is just not possible. To aggravate the situation, many recipient units have subordinate elements detached from the wing or group and scattered over several states. Manpower and economy limit our ability to maintain direct personal contact with such widely scattered elements. To make the problem more acute, several TAC wings have as many as four Reserve forces wings or groups to assist. For these reasons, I have established the policy that my advisory teams will conduct visits to the highest echelon of command in the Reserve unit. They will visit the detached subordinate units only when specifically requested to assist in problems of a major nature, or, at any time it is convenient to visit in conjunction with other business trips.

Now, the sixth step is discharging our advisory responsibility. The advisory team spends the annual fifteen-day active-duty training period with the Reserve component unit. A detailed report is submitted through channels to the Continental Air Command. The most important feature of these reports is the recommendation of the advisory team of steps to be taken to improve subsequent active-duty training tours that will materially aid the unit in reaching a combat capability.

Step seven, the advisory unit conducts an annual five-day indoctrination course for key personnel of the Reserve forces units. The aim of this course is to bring these people up to date in latest Tactical Air Command concepts, doctrines, tactics, techniques, and equipment.

Briefly let me review our responsibility. Remember we act in an advisory capacity only. We aid in preparing training directives, summer training objectives and plans, maintain liaison in the field, actively engage in summer training, conduct annual indoctrination courses, and finally, continually review the Reserve program and submit recommendations to Continental Air Command and to headquarters USAF on any phase of the program we feel needs improvement or change.

I know you are interested not only in what I expect of my Reserve forces, but also how I intend to use them, should it become necessary. By tra-

dition, the United States has the reputation of not being an aggressor nation. The vast majority of our military proudly and strongly uphold this tradition. In the realistic and practical facts of military strategy and tactics, this concedes to the potential aggressor the very great advantage of surprise and initiative in planning an act of hostility. This in turn imposes a severe handicap on us in our planning to engage in effective countermeasures.

Whether it be cold war, peripheral war, or major war, TAC and its Reserve forces have their roles cut out for them. My Regular forces must be ready and capable at all times with our long-range strike force capability to carry out any assignment placed upon them. We must be prepared to dispatch task forces with a variety of weapons scaled for the target to quell brush fires anywhere in the world or to immediately engage the enemy in all-out war. Likewise, I must have the confidence and assurance that my Reserve forces back-up is a force, in being, capable of substitution or augmentation of my Regulars. I must have a second team that nearly measures up to my first team. My ultimate goal is to have a second team that does equal my first team.

The reason we have established this goal is because of the lack of time. Any requirement I may have to employ the services of the Reserve forces units will undoubtedly be of the utmost urgency. We will have little or no time to train or transition, but must rely upon the capability of a unit as it exists at that time. We cannot recall a unit merely in anticipation of an outbreak of hostilities and in that way provide adequate time for training. We must anticipate our needs now so that training can be accomplished prior to any overt act. I expect every Reserve forces commander to insure that his organization has a unit combat capability at all times commensurate with equipment, facilities and manning that he has.

To assist the commander in attaining a combat capability, Tactical Air Command is providing enthusiastic support. Realizing that many units possess a high degree of effectiveness, we have embarked on a program which provides for the use of these units in Air Force and joint Air Force-Army exercises. A token amount of Air Force Reserve and Air National Guard participation was worked into Exercise Sagebrush last fall. This August, Exercise Pine Cone will find our Reserve forces providing one-third of the task forces involved. Participation in such exercises provides realistic training and affords our people the opportunity to critically evaluate the capability of their units.

Many people might say my goal of a completely ready second team is too optimistic and idealistic. They will contend that shortages of equipment, obsolete equipment, and manpower shortages will prevent a Reserve component unit from ever reaching an acceptable combat capability. I disagree. If you will think back but a few short years, you will realize that any comparison of the Reserve forces as they were prior to recall for the Korean war and the Reserve forces as they stand today is quite ridiculous. I recall in particular, a Reserve unit designated as a medium bomb wing. It had nothing to fly but a handful of borrowed T-6s. The confusion that existed during the Korean recall is symbolic of the stop-and-go planning which I previously mentioned. Our progress in the Reserve forces during the past few years may not be astronomical, but must be considered nearly so in view of the obstacles and barriers it had to overcome.

Speaking of time – keep in mind that a year to a Reservist is not a calendar year—not by a long shot. He trains one weekend a month plus fifteen days' active duty, which adds up to thirty-nine training days. Add several more days that he works on his own time and expense, and the average year for a Reservist is probably fifty days! Believe me, in a "Fifty-day year" a Reservist must keep hopping in order to meet the training requirements that we lay on him.

Previous speakers have touched on many areas in which we have taken great strides forward. I would like to recap a few points that I feel have enabled my second team to come as far as it has in so short a time.

First—Stability of planning, which has resulted in a firm goal for both the Reserves and Regulars. Everyone from the President, the Congress, the Joint Chiefs of Staff on down—everyone is behind this program. We have no way to go except forward.

Secondly—Today we have a Reserve force largely equipped with jets. This includes first-line aircraft such as the F-84, '86, '89, and '94.

Next, the manning has increased in leaps and bounds, as a result of a vigorous program by the unit commanders, augmented by the Selective Assignment program. There was an increase of over 10,000 men last year in the Reserve forces units M-day assigned to Tactical Air Command alone. While mentioning manning, I draw your attention to the policy change in recently revised Air Force Regulations. It requires that those Reservists in a "Ready" category definitely be ready. No more delays or deferments in our Reserve forces units. This assures me of receiving all assigned personnel immediately upon recall.

The pay-off of an excellent training program is evident by the fact that we now have Air National Guard and Air Force Reserve fighter units actually standing runway alert on a routine basis. It is further evident by the unqualified participation by many units in joint exercises.

Barely a year ago, in a speech at the Air Force Association's Tactical Air Command Symposium in Washington, I permitted General McCarty to make the statement that our national economy did not permit the delivery of aircraft from production line direct to Reserve forces units. It was my honest belief at that time that we could not afford it and that Reserves would have to be satisfied entirely with "hand-me-downs." Today, my Air National Guard tactical reconnaissance wings are receiving RF-84Fs direct from the production line.

Recently I have learned that the Air Force Reserve Air Technician Plan has been given a new lease on life and in all probability in the not too distant future will become a reality. This will provide for the Air Force Reserve units a hard core cadre of experienced technicians comprising approximately twenty percent of the unit strength, such as now is enjoyed by our Air National Guard units. Believe me, each time I visit a Guard unit and see the maintenance experience level of ten to twelve years, I wish I could establish some such program in my Regular units where the experience level is less than half of that.

All in all, we have come a long way in the past few years. This program is proof that everyone is pulling together in the same direction toward a common goal. It is also proof, in my opinion, that those units still operating with obsolete equipment have a bright future. We are going forward—there will be no let-up. A reasonable amount of patience and continued teamwork will see my goal fulfilled – a second team, in being, ready to go on a few hours' notice. —END

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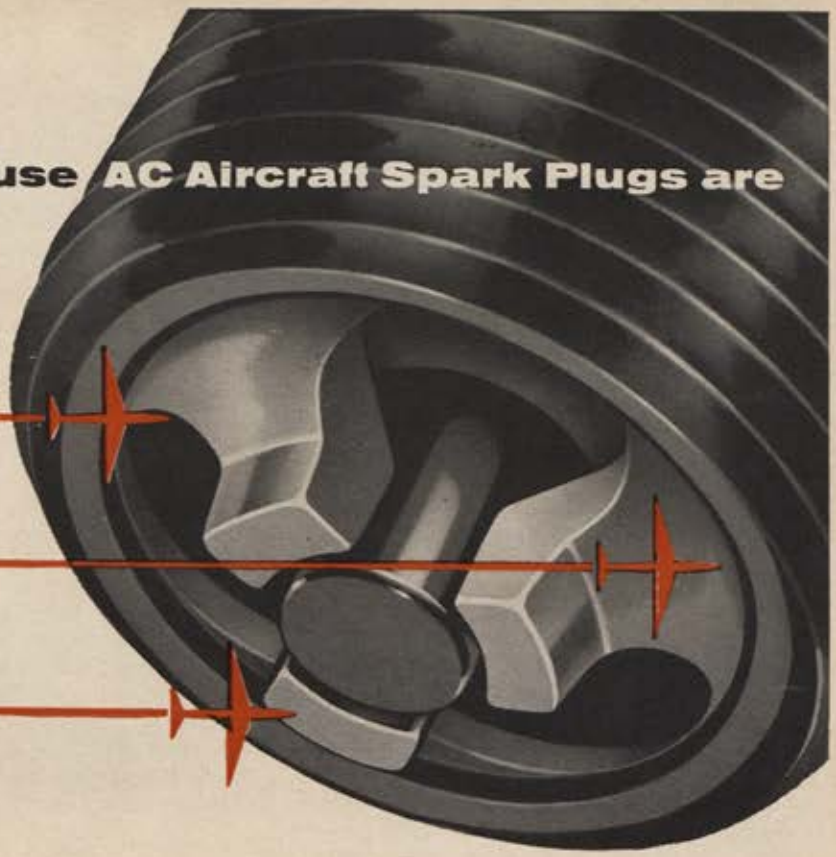

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aircraft spark plugs

SHOOTING THE BREEZE

WITH THE EDITORS OF AIR FORCE MAGAZINE

Part of the backwash of a National Convention is the flood of letters and clippings which pour into our office. These are always welcome, for, better than anything else, they are tangible evidence that what went on at the convention conveyed an impact. This month we'd like to devote "Shooting the Breeze" to a more-or-less random sampling of some of the comments.

☆

Nothing made us feel any better than a letter signed by the nineteen outstanding airmen who were honored guests of the Air Force Association—one each from the major AF commands plus the Air Guard and Air Reserve *(see page 54)*. Their letter read as follows:

"May we take this opportunity to thank every member of the Air Force Association for being AFA's guests at its National Convention in New Orleans.

"We, along with hundreds of the registered delegates, salute you for your unique method of stressing technical manpower. Individually we are grateful for the privilege of being part of your convention theme.

"All nineteen of us join together in saying we accept the recognition given us with great humility as well as great pride, hoping we prove ourselves worthy of such outstanding recognition. Please accept our deepest gratitude to each person responsible for creating an experience that all of us shall remember and cherish."

☆

M/Sgt. Doyle Webb, honored as the outstanding Reserve airman of the nation, added a personal note.

"In the very near future," wrote Sergeant Webb, "you will be receiving applications for membership in AFA, because I am personally starting a membership drive among my associates known to be eligible. Since my return from the convention it has been my privilege to appear as guest speaker at the Rotary Club, Lions Club, Optimist Club, and the Junior Chamber of Commerce, where I told each audience they, as citizens, could further the cause of airpower by supporting that great organization, the Air Force Association."

☆

Citation of Honor winner and lady broadcaster, Del-Vina Wheeldon, of WCKY, Cincinnati, Ohio, wrote:

"I am trying very hard to get back to the routine of my workaday world. . . . It was a week I shall never forget. I met the greatest people in the world. When I promised . . . that if there was anything I could do to help the Air Force in my small way, that I was ready to do it now and in the future, it came from a very full and sincere heart."

☆

Other women broadcasters, seeing AFA in action for the first time, were equally impressed. Ruth Young, of WEDO, Pittsburgh, said, "I have been talking of nothing else but the Air Force on my show, all as a result of my trip to the AFA convention."

And Charlotte Regula of WESA, Charleroi, Penna., reported, "I started the AFA convention report on my program August 7 and wound up with recorded excerpts of General Twining's speech on August 20. There has been a great deal of comment and interest in the series. . . . Hope this wakes up the area and keeps it awake."

☆

The delegate's viewpoint was well-expressed in a letter from Phil Knight, Commander of AFA's Twin Cities Squadron. He wrote, "This is to express in a small way my feelings and those of us Minnesotans who so thoroughly enjoyed the 1956 convention. To those of us attending our first AFA convention, it was inspirational and informative. Those who had attended half a dozen or more conventions reported that this was far and away the best yet."

☆

Vern Haugland, Aviation Editor of the Associated Press, saw the affair from still another point of view—that of the working newsman. He liked it and said so:

"Let me congratulate AFA on that better-than-ever convention in New Orleans. As usual, the press facilities were tops. . . . The program was unusually well-arranged to make this certainly one of the most significant aviation meetings in a long, long while."

☆

Some industry comments:

"The New Orleans Convention and Airpower Panorama were a well-organized and successful effort. All who worked on the affair are to be congratulated."

"This year's convention certainly surpassed all others. AFA is right at the top of our priority list. . . . Everyone feels that a great deal is to be learned and accomplished through attendance."

"Congratulations on a wonderful meeting."

"Have attended five AFA conventions. This was the best organized, most smoothly run one yet."

"Your convention was an extremely well-run affair. Of great interest to me was the Manpower Symposium. The proper approach was taken in the expression that we should not engage in a numbers race with the USSR in educating scientists and engineers. Rather, our efforts should be applied to development of a continuing supply of these people which is adequate to our needs. The Guided Missiles Conference was the best presented unclassified discussion which I have ever heard of a classified subject."

☆

What Air Force people had to say:

"The best event of its kind that I have ever had the privilege to attend."

"It would be difficult to say that any one function was the major convention highlight. The Missiles Conference was a complete success. The Logistics Conference was excellent and the Manpower Symposium outstanding. The Reserve Forces Seminar was the best yet and certainly your action to honor our outstanding airmen was most commendable in every way."

"I appreciate the organization necessary and the close

(Continued on following page)

attention to detail that make for a successful meeting of this stature."

"The convention ran smoothly throughout and provided all of those in attendance with an improved and more intelligent view of American airpower."

"Excellent management resulted in one of the best exhibits it has been my pleasure to view to date. The exhibit is bound to have had a salutary effect on all those who visited it."

☆

Maj. Gen. Matthew K. Deichelmann, given a Citation of Honor for his work as Commander of the Air Force ROTC program, called the convention "superb. I have never attended a convention, military or civilian, at any time, that could even come close to this one. It was so very well-organized, and the events in each case were of high interest value and appropriately scheduled. All who contributed did a tremendous amount of intelligent planning and, above all, a lot of hard work."

☆

From Robins AFB, Ga., came this letter from Col. Frank C. Auten, Jr.:

"As Commander of the 3503d USAF Recruiting Wing, I wish to express to the Air Force Association our sincere appreciation for honoring us with the AFA Tiger Award. This recognition and attendant publicity has increased immeasurably the prestige and spirit of our organization. We look forward with confidence and determination to an even better performance in 1957.

"I wish to thank the Association personally for a very enjoyable visit. The meetings were enlightening, the socials most pleasant, and the atmosphere hospitable.

"The Association is doing a wonderful job of assisting our country in maintaining its rightful status in the air. I am proud to be numbered among its membership."

☆

It isn't often that we single out a rival publication for special praise. But we'd like to commend Fourth Air Force's *Reserve Horizons* as one of the most professional pieces of GI journalism on a shoestring budget that we've ever seen. We especially liked the August 20 issue because all sixteen of its pages were devoted to a pictorial report on the AFA convention. Its editor is one of the best, and hardest-working, newsmen we've ever met, in or out of uniform—M/Sgt. Bill Costello.

☆

At press time we had hardly made a dent in the mountain of newspaper clippings that filled a packing case in our office. In sheer volume the impact of the convention on the nation's press was staggering. In digging through the clips we were pleased to discover that the convention had inspired editorials in more than two dozen daily papers, thus dramatizing the nation's airpower problems at a most critical point in history.

☆

The New Orleans *States* put its finger on exactly why AFA goes to the bother and expense of annual conventions in an editorial on convention eve. Said the *States:*

"Significance envelops the Tenth Annual Convention of the Air Force Association in New Orleans this week. . . . Current airpower issues and problems confronting the nation's air defense and attack systems will be explored by top civilian and military experts. From such discussions will come a more comprehensive grasp of where the United States stands in relation to its security goals. . . . It becomes apparent that this is perhaps one of the most significant conventions New Orleans has ever hosted."

☆

The Baton Rouge, La., *Times* concentrated its editorial thinking on the convention's Guided Missiles Conference:

"Reports of the talks made at the Air Force Association meeting in New Orleans . . . stir the imagination as to the nature of any future war—if we are so unfortunate as to have one. High ranking officers of the Air Force and civilian technicians have emphasized the vastly changing nature of war weapons. . . . While recognizing the need to have the kind of armed forces which could function in a situation such as developed in Korea, there is possibly a need to shift the major emphasis to . . . airpower and nuclear weapons, with a reduction in manpower."

☆

The Los Angeles *Times* also found the Guided Missiles Conference of interest:

"So much fantasy has surrounded our guided missiles program that the facts have tended to be obscured. Lt. Gen. Thomas S. Power, chief of the Air Research and Development Command, recalled this to the Air Force Association convention in New Orleans when he reminded his listeners that the science of guided missiles is still in its infancy.

"This is not to say that guided missiles will be a negligible factor in either defense or offense; General Power himself declares that our present operational missiles as well as those in the process of development hold much promise. But there are monumental problems attending the whole problem, basic as well as complicated in nature. . . .

"One thing seems to be clear: World War III, if it ever comes, will not and cannot be fought under the ground, sea, and air rules of World War II. General Twining has said that emphasis is inevitably going to be placed on nuclear weapons; he believes that conventional forces organized and equipped for old-style warfare should and must be reduced. His view is a controversial one, of course, but there seems to be a growing acceptance by the major world powers, including Russia, of nuclear weapons in military contests.

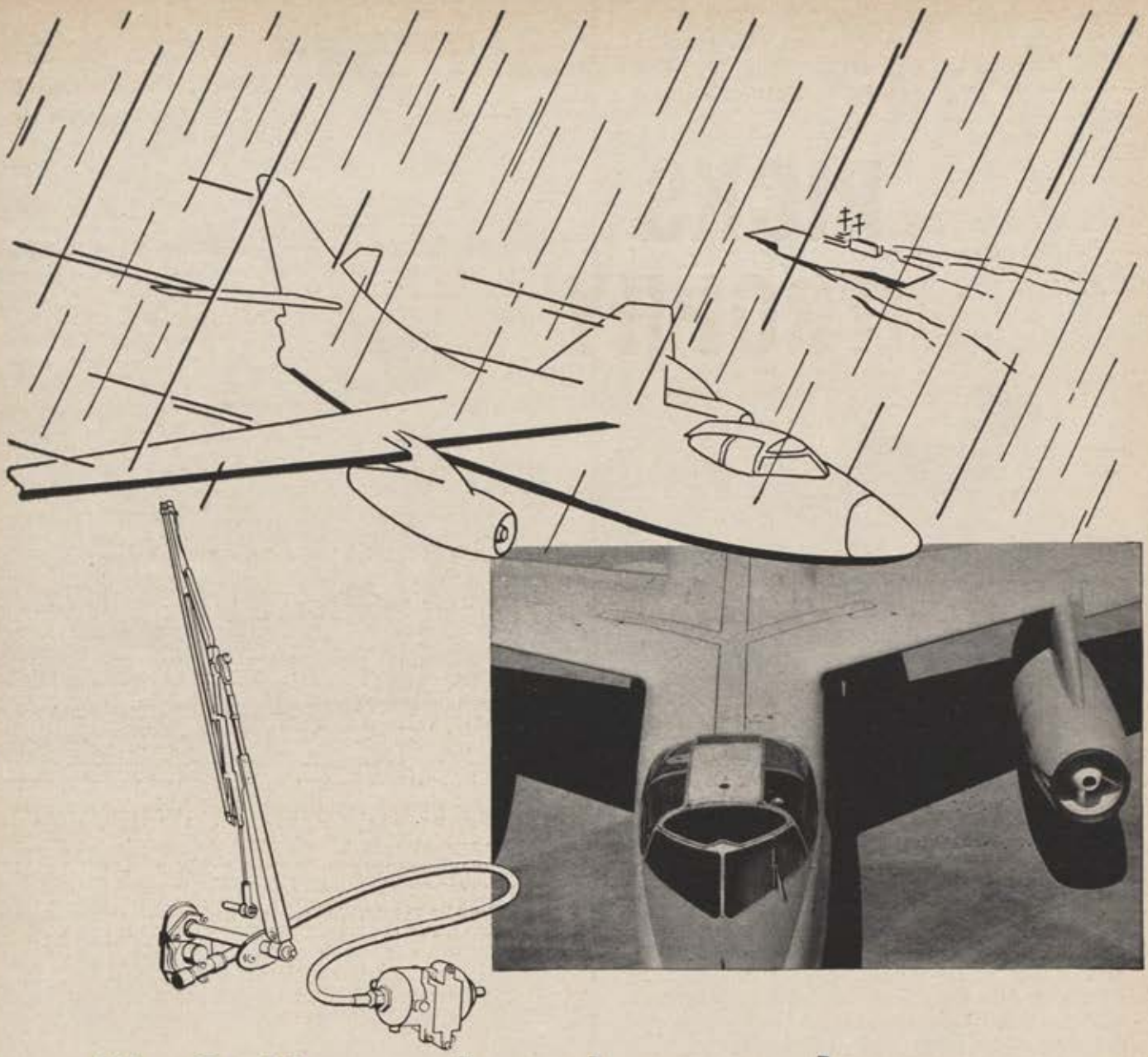
"The great concern of some of our military leaders is where the priority of effort should be exerted, particularly in the guided missile program."

☆

In commenting on AFA's Statement of Policy, the Norwalk, Conn., *Hour* said, "A single service is a long way off. Land and sea functions will long require an Army and Navy. But while a merger seems insurmountable now, a transfer of officers, and a merger of research and weapons development, might make for shortcuts in achieving a breakthrough that might decide the scientific war of the future."

☆

In another look at the Statement of Policy the Denver *Post* commented: "As a first step toward the creation of a single service, the Air Force Association urged 'freedom of transfer' between the services to insure the most efficient use of manpower. Significantly, the resolution was drafted by a committee of old military hands. . . . In the past, 'alumni' of the various services have helped keep interservice rivalry alive. If the 'alumni' use their influence in behalf of a single service, achievement of that goal may be possible at last."—END



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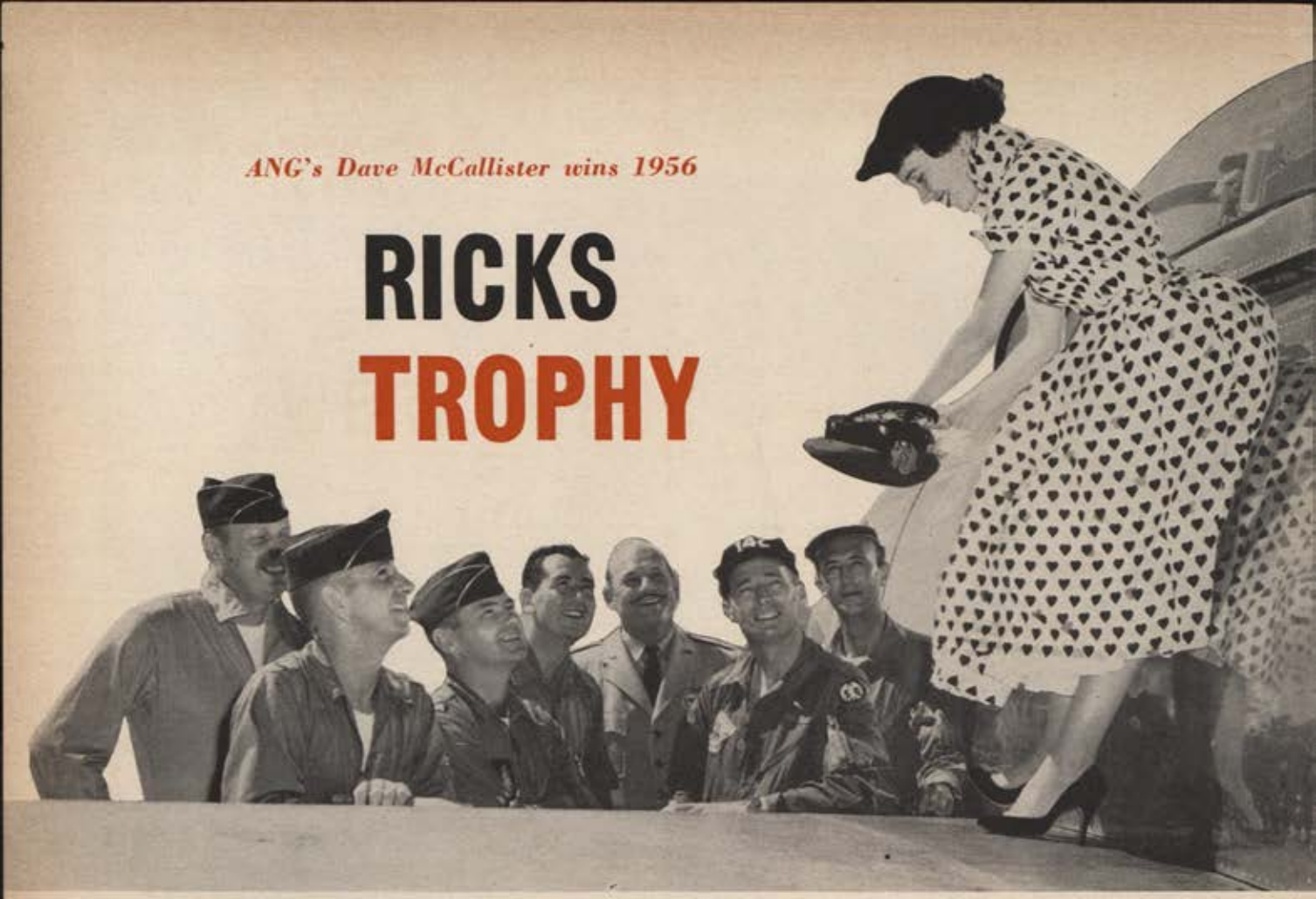
ANG's Dave McCallister wins 1956

RICKS TROPHY



Joanne Alford, AFA's Miss Airpower of 1956, presides at drawing for starting positions in third Ricks Trophy run.

By Edmund F. Hogan RESERVE AFFAIRS EDITOR

WHEN HE isn't manufacturing soup, or writing novels, or catering dinners, or selling navigational aids, David F. McCallister of Swarthmore, Penna., is flying jet aircraft. And he flies them so well that McSnapper—as he is known in the flying fraternity—is the new holder of the Air Force Association's Earl T. Ricks Memorial Trophy.

An Air National Guard major who commands Delaware's 142d Fighter-Interceptor Squadron, McSnapper won the third annual AFA Ricks Memorial Trophy event, which this year kicked off the Association's convention in New Orleans.

Flying a North American F-86 Sabrejet, McCallister covered the 1,922 miles between Hamilton AFB, San Francisco, and Moisant International Airport, New Orleans, in three hours, thirty minutes, and eight seconds. His average speed was 547.68 miles per hour.

Second place went to Capt. Vernon D. Jersey of the 163d Fighter-Interceptor Squadron, Fort Wayne, Ind. Jersey's elapsed time was three hours, thirty-two minutes, and nineteen seconds.

Third place went to Capt. C. R. Carmichael of the 8156th Replacement Training Squadron, Charlotte, N. C. Carmichael negotiated the distance in three hours, thirty-three minutes, and forty seconds.

Fourth place was won by Maj. Leland W. Cranmer of the 108th Fighter-Interceptor Group, McGuire AFB, Trenton, N. J. Cranmer covered the distance—just ten seconds behind Carmichael—in the total time of three hours, thirty-three minutes, and fifty seconds.

In fifth place was Maj. J. Raymond Donahue of the 195th Fighter-Interceptor Squadron, Van Nuys, Calif. Donahue made the run in the time of three hours, thirty-nine minutes, and twenty seconds.

Sixth place went to Maj. Henry Bosserman of the 115th Fighter-Interceptor Squadron, also based at Van Nuys. His time added up to four hours, six minutes, and thirty seconds.

The seventh entrant in the event, Capt. Robert E. Railey of the 121st Fighter-Interceptor Squadron, Washington, D. C., failed to finish. Railey experienced mechanical trouble and set down at Lubbock, Tex.

The event is sponsored annually by the Air Force Association, both to point up the high level of proficiency which Air Guard jet pilots must maintain and to honor the memory of the late Maj. Gen. Earl T. Ricks, former chief of the National Guard Bureau's Air Force Division, who devoted his life to the cause of airpower.

McCallister's victory came in his second try for the trophy. Last year when twenty-two Guard pilots flew from Los Angeles to Detroit, McCallister finished far down the list.

This year McSnapper flew with only one drop tank, a configuration that puzzled almost everyone connected with the event. This meant that he would be required to make three refueling stops instead of two. Because time spent on the ground for refueling was included in the total time for the event, McSnapper was counted out in the advance doping even before he took off.

But the reed-thin peripatetic jet jockey had the last laugh. He flew at altitudes between 18,000 and 32,000 feet—which gave him greater ground speed than competitors flying at higher altitudes—and McSnapper wisely placed

his confidence in refueling crews from his own squadron.

Davey's confidence was not misplaced. He spent fewer than two minutes on the ground at his first refueling point —Las Vegas; a little over two minutes at Albuquerque; and two minutes at Fort Worth. Meantime his ground speed was averaging approximately five miles per hour more than his nearest competitor, Captain Jersey.

The longest single leg was flown by Donahue in a masterful demonstration of cruise control. He took his Sabrejet approximately 1,000 miles between Hamilton and Albuquerque in one hop.

This year's event differed from the 1955 event in that it was restricted to the North American F-86. Last year the run was open to all types of aircraft in the Air Guard inventory. Six types entered and a handicap system was devised. Although each type was represented in the first six aircraft to finish, the handicap system produced unfavorable reaction among the pilots entered.

To eliminate complaints and to simplify the logistic support required for the event, Maj. Gen. Winston P. Wilson, who succeeded General Ricks in the Guard Bureau, ruled that this year's event and all subsequent events would be restricted to one type of aircraft. This eliminated the need for a handicap and made total elapsed time for the distance the decisive factor.

McCallister, who served as the real life model for Milt Caniff's comic strip character, Charles Charles, rehearsed with his refueling crews at his home base of New Castle County Airport in Delaware for months.

"Ground speed," McCallister told Maj. Billy Means, operations project officer for the Guard Bureau, in San Francisco just before the event, "will win, if you don't spend more than two minutes on the ground for refueling."

His three hose crews bore him out.—END

Maj. David F. McCallister, winner of the third annual AFA Earl T. Ricks Memorial Trophy event, poses astride his Sabrejet with crew chief, T/Sgt. William Roberts.

Maj. Billy Means, Guard Bureau project officer, briefs pilots in Ricks event prior to take-off.

McCallister, Ricks event winner, caught by camera as he gets flag to take off on run to New Orleans.

Maj. Gen. Winston Wilson, NGB Air Force Division chief, and Mrs. McCallister, greet Ricks event winner.

McSnap feels fine as he takes over Ricks Trophy. Al Schwab and new AFA prexy, John P. Henebry, seated, seem as pleased.

THE DELEGATES WERE BUSY

A round-up of what they accomplished during business sessions in New Orleans

John P. "Jock" Henebry, newly elected AFA head.

THE delegates to AFA's Tenth Annual National Convention in New Orleans last month climaxed their business meetings for another year by electing John P. "Jock" Henebry of Chicago, President of the Association for 1956-57. Election of national officers (*see box*) for another year was only part of the business the delegates faced when they arrived in the home of Dixieland and creole gumbo.

Last year's convention in San Francisco had been the biggest and best to date, and it was hard to imagine one that could outdo it. But the New Orleans affair topped it, and was an appropriate entry into AFA's second decade as the largest independent airpower group in the US.

Once again, the Association showed that it could face an extremely controversial issue and come out with a definite stand on it. According to the delegates, in their 1956 Statement of Policy, "The three-service system can no longer be tolerated. The goal must be one program for utilizing national resources in the national defense. We must have one defense plan. We must have a single military service with one secretariat, one Chief of Staff, one promotion list." As the first step toward accomplishing this goal, they urged freedom of transfer among the services (*see page 38*).

Press reaction to the stand was generally favorable. The Denver *Post*, talking about interservice rivalry, said it "has made less and less sense to the American people, year by year." The *Post* went on to tell about AFA's stand and added: "Significantly, the resolution was drafted by a committee of old military hands, including Lt. Gen. James H. Doolittle, Gen. Carl A. Spaatz, and Gen. George C. Kenney, all retired; C. R. Smith, president of American Airlines, and others."

AIR FORCE ASSOCIATION'S NEW LEADERS

Elected for the Year 1956-57 at New Orleans, La., August 4, 1956

SECRETARY
***Julian B. Rosenthal**
New York, N. Y.

PRESIDENT
John P. Henebry
Chicago, Ill.

TREASURER
***Samuel M. Hecht**
Baltimore, Md.

REGIONAL VICE PRESIDENTS

New England Region **Thomas C. Stebbins*	**Northeast Region** *Leonard A. Work*	**Central East Region** *William W. Spruance*	**Southeast Region** **Alex G. Morphonios*	**South Central Region** *Frederick O. Rudesill*	**Midwest Region** **J. Chesley Stewart*
Southwest Region **Clements McMullen*	**Rocky Mountain Region** *Gwynn H. Robinson*	**Great Lakes Region** *Jerome Green*	**North Central Region** **Edwin A. Kube*	**Northwest Region** **Winfield G. Young*	**Far West Region** *Charles Morgan, Jr.*

Pacific Ocean Area Region
**Roy J. Leffingwell*

NATIONAL DIRECTORS

Chairman of the Board—Gill Robb Wilson, New York, N. Y.

****John R. Alison** *Hawthorne, Calif.*	***George A. Anderl** *Chicago, Ill.*	***Walter T. Bonney** *Washington, D. C.*	**Benjamin W. Chidlaw** *Cleveland, Ohio*	***John J. Currie** *Paterson, N. J.*	****Edward P. Curtis** *Rochester, N. Y.*
****James H. Doolittle** *New York, N. Y.*	**Joseph J. Foss** *Pierre, S. Dak.*	**Jack B. Gross** *Harrisburg, Penna.*	***George D. Hardy** *Hyattsville, Md.*	****Robert S. Johnson** *Garden City, L. I., N. Y.*	**Michael Kavanaugh** *San Francisco, Calif.*
****Arthur F. Kelly** *Los Angeles, Calif.*	****George C. Kenney** *New York, N. Y.*	****Thomas G. Lanphier, Jr.** *San Diego, Calif.*	**Stephen F. Leo** *Washington, D. C.*	***Carl J. Long** *Pittsburgh, Penna.*	**Hardin W. Masters** *Oklahoma City, Okla.*
***Msgr. William F. Mullally** *(ex-officio)* *St. Louis, Mo.*	***Peter J. Schenk** *Fayetteville, N. Y.*	****C. R. Smith** *New York, N. Y.*	****Carl A. Spaatz** *Washington, D. C.*	**William Sparks** *(ex-officio)* *Cmdr., Arnold Air Society* *Denver, Colo.*	**Arthur C. Storz** *Omaha, Nebr.*
****Harold C. Stuart** *Tulsa, Okla.*	**James M. Trail** *Boise, Idaho*	**S. Ernest Vandiver** *Lavonia, Ga.*	***T. F. Walkowicz** *New York, N. Y.*	***Frank W. Ward** *Battle Creek, Mich.*	***Morry Worshill** *Chicago, Ill.*

* Incumbent

** Permanent member

"In the past," the editorial continued, " 'alumni' of the various services have helped keep interservice rivalry alive. If the 'alumni' use their influence in behalf of a single service, achievement of that goal may be possible at last."

In their selection of a new president, the AFA delegates elected a candidate who was nominated from the floor. George A. Anderl of Chicago, Ill., who earlier had been named by the nominating committee, withdrew his name before the balloting began, and "Jock" Henebry was elected by acclamation.

AFA's new national leader is president of Skymotive, Inc., a Chicago company for servicing business aircraft and conducting airline terminal operations. He replaces Gill Robb Wilson, editor and publisher of *Flying* Magazine who was named Chairman of the Board for the coming year. Other national officers who were reelected included Julian B. Rosenthal, New York City lawyer, National Secretary, and Samuel M. Hecht, Baltimore and Washington D. C. department store executive, National Treasurer.

Mr. Henebry is a brigadier general in the AF Reserve and has been a National Director of AFA for several years. He has been a member of the Air Staff Committee on Reserve Policy for three years, and recently was reappointed chairman of this committee. He was born in Plainfield, Ill., in 1918 and was graduated from Notre Dame University in 1940 with a B.S. degree. After receiving his wings in 1941 he became a distinguished combat leader in the Pacific war. In 1944, at the age of twenty-six he was made a full colonel, and in 1946 he was released from active duty. He formed Skymotive, with headquarters at Chicago's O'Hare Field, at that time. In 1948, at the age of thirty, he was promoted to brigadier general and in 1950 was recalled to active duty in Korea, where he served as Combat Cargo Commander. He was released from his second tour of active duty in 1952.

There are nine new faces on the Board of Directors; six new Regional Vice Presidents were elected. The new directors are: Benjamin W. Chidlaw, Cleveland, Ohio, retired four-star AF general who formerly headed the

(Continued on following page)

★ AFA FAMILY AWARDS ★

THE PRESIDENT'S TROPHIES

Thos. F. Stack, San Francisco, Calif., AFA's Man of the Year.
The Utah Wing, AFA's Unit of the Year.

UNIT EXCEPTIONAL SERVICE PLAQUES

Nittany Squadron, State College, Penna., Aviation Education Plaque.
Hoyt S. Vandenberg Squadron, Detroit, Mich., Reserve Affairs Plaque.
San Francisco Squadron, San Francisco, Calif., Community Relations, National Defense Plaque.
Metropolitan Squadron, New York, N. Y., Membership Plaque.

INDIVIDUAL EXCEPTIONAL SERVICE PLAQUES

Len Dereszynski, Milwaukee, Wis.
Jack B. Gross, Harrisburg, Penna.
Clyde H. Hailes, New Orleans, La.
Robert P. Knight, St. Paul, Minn.
Julian B. Rosenthal, New York, N. Y.
Harold C. Stuart, Tulsa, Okla.
George H. Van Leeuwen, Ogden, Utah
Winfield G. Young, Jr., Seattle, Wash.

MEDALS OF MERIT

William Barcoff, Hollywood, Calif.
Walter T. Bonney, Silver Spring, Md.
Clive Davis, Sacramento, Calif.
Thomas M. DeArman, Tulsa, Okla.
George Edgcumbe, Mt. Prospect, Ill.
George D. Hardy, Hyattsville, Md.
Al Harting, Dallas, Tex.
Samuel M. Hecht, Baltimore, Md.
John P. Henebry, Park Ridge, Ill.
W. Barton Leach, Cambridge, Mass.
Stephen F. Leo, Washington, D. C.
George E. Lyons, Jr., Tampa, Fla.
Kathryn Patterson, Pittsburgh, Penna.
Fred O. Rudesill, New Orleans, La.
Russell Ruppert, Allentown, Penna.
Charles Russhon, New York, N. Y.
Alfred C. Schwab, Jr., St. Paul, Minn.
Paul A. Simmons, Clearfield, Utah
Arthur C. Storz, Omaha, Nebr.
T. F. Walkowicz, New York, N. Y.
David H. Whitesides, Layton, Utah

San Francisco's Thos. F. Stack is named AFA's Man of the Year for '56.

The Grand Ballroom in the Roosevelt Hotel—scene of the AFA business sessions. The delegates spent many hours here conducting Association business.

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DELEGATES — CONTINUED

Air Defense Command; Joseph J. Foss, fighter ace of World War II and now Governor of South Dakota; Jack B. Gross, Harrisburg, Penna.; Michael Kavanaugh, San Francisco, Calif.; Stephen F. Leo, Washington, D. C.; Hardin W. Masters, Oklahoma City, Okla.; Arthur C. Storz, Omaha, Nebr.; James M. Trail, Boise, Idaho; and Georgia's Lieutenant Governor S. Ernest Vandiver, Lavonia, Ga.

The new Regional Vice Presidents include Charles Morgan, Jr., Far West Region; Gwynn H. Robinson, Rocky Mountain Region; Frederick O. Rudesill, South Central Region; William W. Spruance, Central East Region; Leonard A. Work, Northeast Region; and Jerome Green, Great Lakes.

This year, a record number (thirty-five) of AFA Family Awards were given to individuals and units (*see box on page 177*). Two of the awards, the President's Trophies for AFA's Man of the Year and AFA's Unit of the Year were presented at the annual Airpower Awards Banquet in the Roosevelt Hotel on Saturday night, August 4. The others were presented at the Airpower Brunch on Sunday morning. Thos. F. Stack, a San Francisco lawyer won top honors when he was named AFA's Man of the Year; and the Utah Wing of AFA was named the Outstanding Unit in AFA. Mr. Stack was honored as "an outstanding leader in the Air Force Association activities since the organization was founded in 1946," and the Utah Wing was honored for its "continuing emphasis on aviation education."

It had already been determined in San Francisco last year that Washington, D. C., would be the site of AFA's 1957 convention. A city had to be picked for 1958, however, and as this year's meeting drew toward a close, a committee began considering two spots for 1958—Dallas, Tex., and Cleveland, Ohio. A final report on the selection will be made later.

The delegates also amended the AFA constitution relating to the selection of a convention city, because as the conventions increase in size and scope, it becomes increasingly difficult to engage convention facilities in the major cities on advance notice of only two years. Section One of Article IX of the National Constitution was amended to read as follows:

"Section 1. The convention. National conventions shall be held annually at a time fixed by the Board of Directors and at a site which shall be selected as follows:

(a) The delegates at each national convention, after receiving the report and recommendations of the Convention Site Committee, shall "express their preference, if any, for one or more sites at which the conventions shall be held during each of the five ensuing years." The amendment goes on to say that the Convention Site Committee shall "investigate the sites so preferred by the delegates. The report and recommendations of this committee will then be submitted to the Board of Directors for final action."

In another amendment to the National Constitution, when any Division or Wing is entitled to more delegates than it has duly selected

(Continued on page 181)

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Mitchell portrait goes to Mr. Wilson.

delegates present at the convention, Wing Commanders are now permitted to appoint additional delegates from among active members affiliated with such Division or residing within such Wing, who are both present and registered at the convention. In the past, only Regional Vice Presidents or the National President were permitted to make these appointments.

Briefly, here are the other resolutions dealing with Association matters that the delegates adopted:

• The delegates agreed that Regional Vice Presidents of AFA shall be reimbursed for all reasonable and necessary expenses incurred in the performance of their duties, up to $150 quarterly.

• A resolution submitted by the National Secretary and adopted by the delegates requires that all proceedings of the meetings of the National Board of Directors and of the National Nominating Committee shall be recorded in shorthand or by stenotype by a professional stenographer or stenotypist, and that copies of the transcript be made available to all members of the Board of Directors upon their request. The National Secretary will continue to prepare official minutes of the meetings, but in the event of any inconsistency between the transcripts and the minutes prepared by the Secretary, the Secretary's minutes will be revised.

• Because the National Ladies Auxiliary of AFA consists of not more than three Wings, the delegates voted to discontinue it as a national organization. However, the AFA will continue to vigorously support a Ladies Auxiliary on a Wing and local basis.

• Because of the valuable contributions made by Associate Members of AFA, the delegates voted to allow Associate Members to receive the same membership pins—but including the word "Associate"—as the Active and Service members of AFA.

• National Headquarters was directed to investigate the possibility of revising the address mailing labels of members so as to indicate whether they are now affiliated with a squadron.

• The President of AFA was directed to appoint a committee composed of members of the Board of Directors to develop a workable and effective plan of membership recruitment.

• The delegates agreed that AFA should have closer liaison with the Civil Air Patrol.

It was a big convention, and it required the hard work of many persons behind the scenes to put it over. Fourteen committees, with 166 volunteer workers staffing them, put in long hours to make the New Orleans convention the most successful in AFA's ten-year history. The committees worked under the direction of General Chairman Frederick O. Rudesill, assisted by vice chairman Clyde Hailes, Vincent Caruso, and Henry G. Plitt.

Heads of the various committees were: **Air Facilities,** Arthur Buddy Koon and Robert L. Davidson; **Decorations,** A. J. Bonomo; **Functions,** Sidney Hardin; **Host,** Maj. Gen. Junius W. Jones; **Information and Membership,** William D. Thompson; **Panorama,** William Briant and Joseph D. Wright; **Promotion,** Chas. "Chick" Frampton; **Registration,** John K. Moore; **Reproduction,** Earl A. Breen; **Special Activities,** Paul Gonzales; **Transportation,** Zach Stanborough; **Squadron Directory and Information Guide,** Arthur J. Pitcher, Jr.; **Wing Hospitality Room,** George J. Decker; and **Speed Boat Regatta,** John "Jeff" F. Waguespack, Jr.—END

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OBJECTIVES

• To assist in obtaining and maintaining adequate airpower for national security and world peace. • To keep AFA members and the public abreast of developments in the field of aviation. • To preserve and foster the spirit of fellowship among former and present personnel of the United States Air Force.

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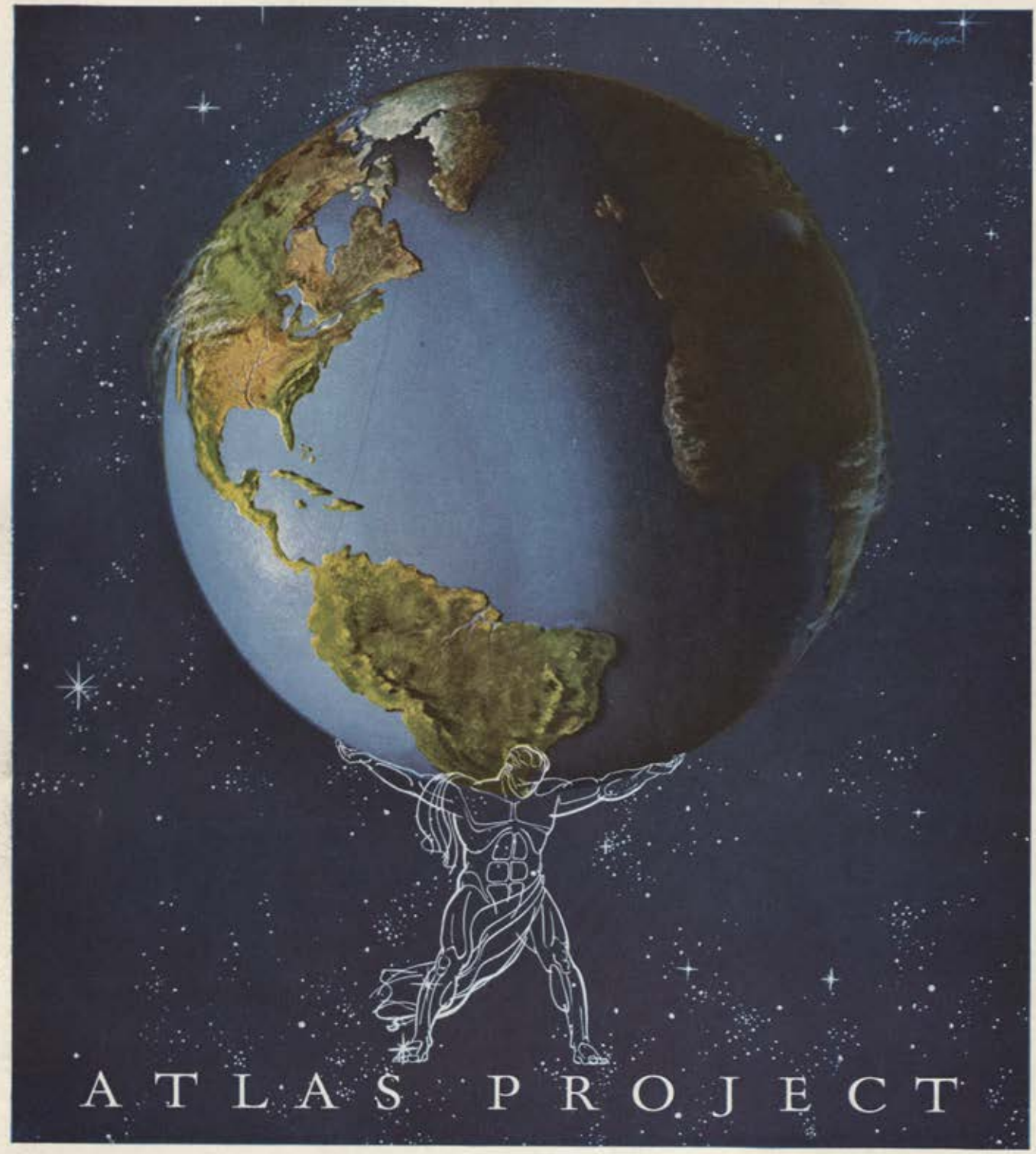

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