



LANGLEY MEMORIAL AERONAUTICAL LABORATORY

GREEN COW MAKES DEBUT MARCH 9

On Friday night, March 9, at 8:30 the Green Cow will make her muchly heralded first appearance under the auspices of her new committee. All Laboratory employees who can muster the necessary four dollars for a year's membership (an unforgiveable error in last week's Air Scoop stated three-fifty) will have the opportunity of attending this premier of a gala year's activity.

Chief Milkman John Houbolt seemed a bit heartbroken about the recent governmental edicts on travel, conventions, brownouts, and curfews. "We had really planned something sensational, stupendous, and extraordinary. Now we won't be able to do anything more than gigantic and colossal. How I wish I could think of another superlative," he moored.

"Oh, it was really going to be wonderful," he rambled on, passing his cud around and offering everyone a chew. "It was to have been something, the likes of which we have never seen before nor would have dared attempt again. All the peers eminent of Cowdom and Bulldom were to have attended. Let me see, there was Elsie (not to be confused with our own Elsie), Ferdinand, Durham, Bodica Design Coupon, and Wammerdam (the one who jumped over the moon). We were going to have searchlights pointing their vari-colored fingers into the inky blackness of the night and all the first nighters were going to get to imprint their hoofs in a new block of concrete at the ballroom. Now we'll be lucky to get a single 60 watt bulb and the best we can do for footprints is to let everybody make them in the mud at the Hampton Armory."

Butcher Marvin Pitkin cut in with, "Eut think how lucky everybody is. With this cutdown on travel they won't have to listen to Tommy Dorsey, or Kay Kyser, or none of them bums. They'll have the opportunity of

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RED CROSS DRIVE STARTS MONDAY; FULL PARTICIPATION EXPECTED

A.T.S.C. GENERALS TO VISIT HERE

March 13 will be a memorable day. Upon the invitation of Dr. J. C. Hunsaker, Chairman of the Committee, a distinguished group of high-ranking officers of the Air Technical Service Command will visit Langley Field to inspect the NACA facilities and address the entire personnel of this Laboratory.

The officers include Major General K. B. Wolfe, Chief of Engineering and Procurement, Brigadier General Franklin O. Carroll, Chief of the Engineering Division, and Brigadier General L. C. Craigie, Deputy Chief of the Engineering Division.

The Air Technical Service Command, which is headed by Lt. General William S. Knudsen, is the branch of the Army most directly connected with the NACA. Since it has charge of developing, maintaining and supplying the entire U. S. Air Force, it is the division of the service most interested in the aeronautical progress being made here.

It is expected that the addresses of the aforementioned officers will include expressions of appreciation for the work being done here, and encouragement of even greater endeavor in the future.

Colonel Carl F. Greene of the Langley Field Liaison Office has been largely instrumental in making arrangements for this visit.

This Laboratory, as is customary, will take a very active part in the annual Red Cross drive, and Starr Truscott, chairman of the drive, believes that all employees will respond with the utmost generosity to this worthiest of all causes and bring forth contributions even in excess of the excellent totals of previous years.

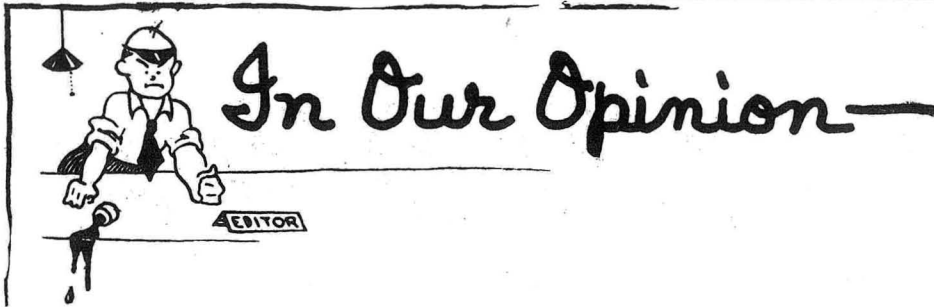
"Every employee," said Truscott, "should feel a true intimacy with the work of the Red Cross, because there isn't one of us who hasn't a near relative or dear friend who is not receiving, or may need to receive, the help of this great organization. The Red Cross reaches every man in uniform, every battle casualty and every possible prisoner of war and, with more and more men under arms, great battles going on and even greater struggles to come, the need for the Red Cross is constantly increasing. This isn't just a 'one-dollar drive.' The amount contributed depends on the individual, of course, but I know all my fellow employees, who have always been most generous in the past, will feel that they are simply not doing their full part for their loved ones in the service unless they give even more generously this year, even if it means a little personal sacrifice."

The Red Cross War Fund Drive was approved by the President of the United States in his letter of February 15. This message stated, in part: "As our nation marshals its forces for the crucial phase of this war, the many services of the American Red Cross, at home and abroad, are of vital and increasing importance."

"Here in America, we can manifest something of our deep gratitude to the heroic dead and their families by our service to the living. Their supreme sacrifice summons our own full measure of devotion to the cause of freedom, justice, charity and enduring peace. Our Red Cross in action is for us all a glorious example of this spirit of democracy which we, too, thus defend."

NEW TELEPHONE NUMBERS

- Electrical Stockroom, West Area, located in new Electrical Building - 4504.
- 16 Foot Tunnel Ground Test Stand located in rear of 16 Foot Tunnel - 4473.



THE THIRTIETH ANNIVERSARY OF THE NACA

Today, March 3, is the thirtieth anniversary of the National Advisory Committee for Aeronautics. On that date, in 1915, an act of Congress creating the committee became effective, and the munificent sum of \$5,000 per year was appropriated for the new organization.

A lot of painstaking research in aeronautics has passed under the bridge since then. Balky, slow, unstable and ugly Army Jennies have developed, with the aid of the NACA, into the slick, streamlined airplanes of today. Thirty years ago, the NACA was working hard on the problem of creating an airplane that could whiz along at 90 miles an hour without falling apart. Now we are helping design airplanes that travel faster than sound. Tomorrow - what? We can only wait and see. Possibly before another thirty years have passed we will be boarding rocket ships nonchalantly and telling our grandchildren about the good old days when people poked along at 450 miles per hour.

Lest the anniversary of our great organization pass unnoticed in the whirl of wartime activity, Air Scoop has brought out the supplement included with this issue. It outlines the progress of the NACA and the work of the Langley Laboratory's three departments, and it reviews the difficulties and achievements of the past thirty years. We'd like you to take it home to read on a quiet evening especially if you're a newcomer to the Laboratory. We hope it will give you a better understanding of the purpose of your work. Let the folks at home and the neighbors read it too. Many of them have only the haziest notion of the functions of an aeronautical laboratory, and possibly this little booklet will give them a better appreciation of the importance of our work in the war effort.

A FRIEND INDEED

Early this week a quiet elderly man left Hampton. Behind him lay thousands of friends gained through years of service to his fellow men. Ahead of him, thousands of new friends and another job.

Frank M. Long, for two and one-half years Director of the local Industrial USO, has retired, but by no means has he stopped work. He has gone to his home in Roanoke to take a position as director of physical education with the public school system. Here he will continue to lead and teach the youth of the land.

The thousands of Lower Peninsula war workers, to whom Frank Long was a combination big brother, father confessor, and friend, will miss him greatly. Any group of people with money can provide a building and stock it with useful facilities, but it takes an understanding, capable man to make it fulfill its purpose. In Mr. Long, the USO had a man who knew what people wanted and needed, knew how to give it to them, and more important, wasn't afraid to "get his hands dirty" and work with them. His enthusiasm easily belied his age. He is truly a man who is more than sixty years young, not old.

The citizens of Roanoke are to be congratulated for obtaining such a fine man to fill their position. He is certain to do his job well. Those of us here have not lost a friend, for a friend like Mr. Long is a friend for life.



All the way from Germany comes a mighty fine letter from H. B. Moore, formerly of Instrument Calibration. Bass says he enjoys hearing about the Green Cow's activities in Air Scoop, and adds that "if everything goes well, it shouldn't be too long before I'll be seeing some of my friends at the Lab again." That can't be too soon for us, either.

But what should make all of us feel mighty proud are his concluding words, "If you continue in the future to turn out the high standard of work that you have in the past, I am sure there is nothing 'der Fuehrer' can dig up that will stop us."

The same day we received a V-mail from Lt. Bill Suttle, in France. Bill has been hopping around from post to post and his Air Scoops have been going through considerable re-routing before reaching him, so he sends us his A.P.O. address in an effort to help the postman.

RED NEIHOUSE WINS STABILITY CONTEST

Loud cries of "Science has triumphed!" and "Stability uber Alles!" greeted the announcement by Jeremiah Kayten that Anshal (Red) Niehouse had successfully defended the Stability Division's claim to possessing the "Men Most Likely To Break Down Resistance."

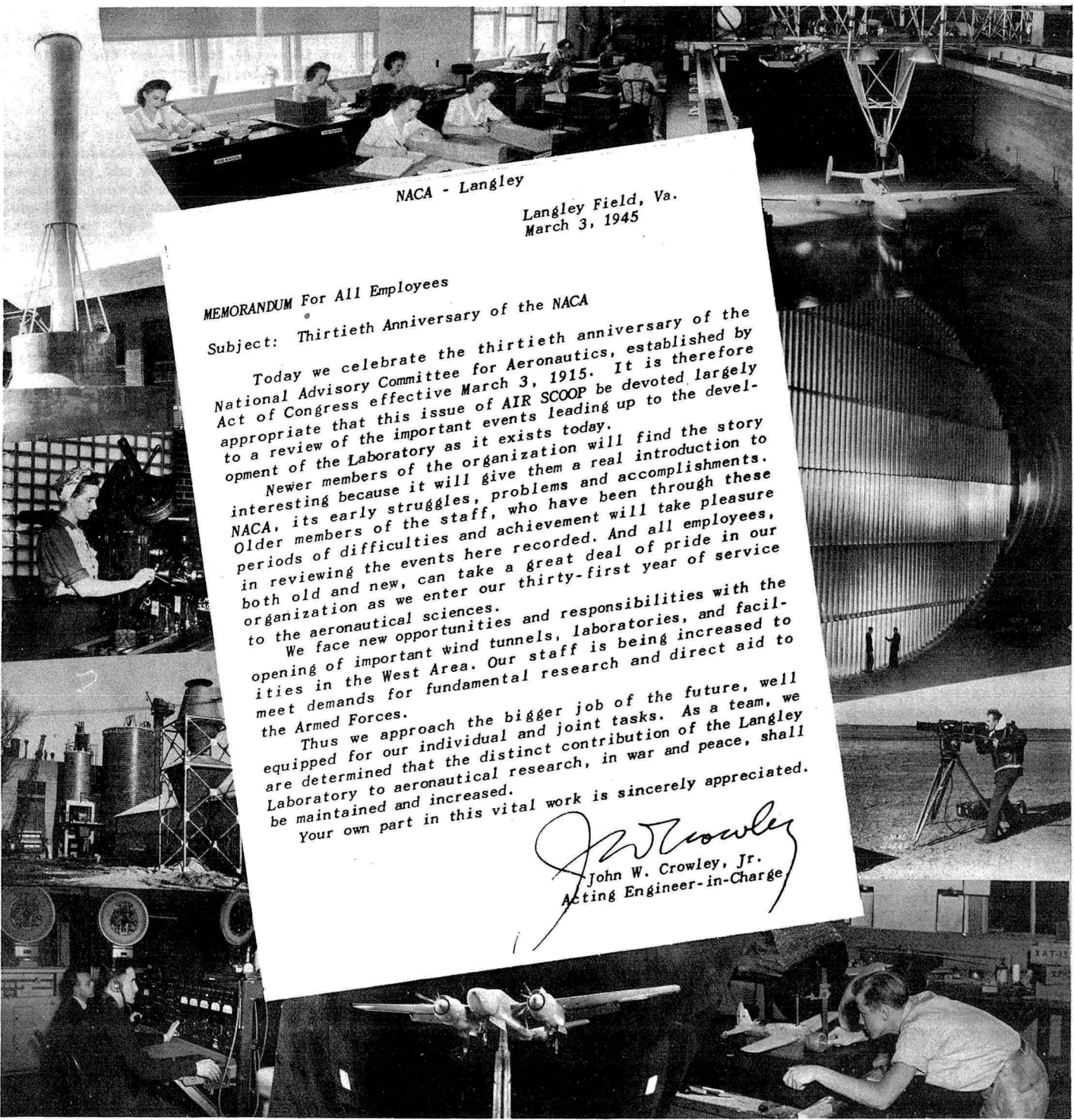
The contest, which took place at the Stability Division dance last Monday night, was marked by a scientific air well in keeping with its purpose. Not wishing to trust the judging of such a vital problem to mere fallible humans, a machine loosely described as an Impulseometer, was constructed. This fiendishly clever device operated in the following manner: the couple selected to demonstrate breakdown of resistance held electrodes - the male contestant the positive, the female the negative - and, as the osculation proceeded, the electrical impulses registered on an illuminated dial plainly visible to the wildly cheering multitude. In order to assure absolutely accurate and unbiased results, Dr. Marvin Pitkin, D.O. (Doctor of Osculation), carefully checked the pulses, reflexes, bridgework, watches and other valuables of the competing couples.

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LOOKING BACK-AND AHEAD



NACA - Langley

Langley Field, Va.
March 3, 1945

MEMORANDUM For All Employees

Subject: Thirtieth Anniversary of the NACA

Today we celebrate the thirtieth anniversary of the National Advisory Committee for Aeronautics, established by Act of Congress effective March 3, 1915. It is therefore appropriate that this issue of AIR SCOOP be devoted largely to a review of the important events leading up to the development of the Laboratory as it exists today.

Newer members of the organization will find the story interesting because it will give them a real introduction to NACA, its early struggles, problems and accomplishments. Older members of the staff, who have been through these periods of difficulties and achievement will take pleasure in reviewing the events here recorded. And all employees, both old and new, can take a great deal of pride in our organization as we enter our thirty-first year of service to the aeronautical sciences.

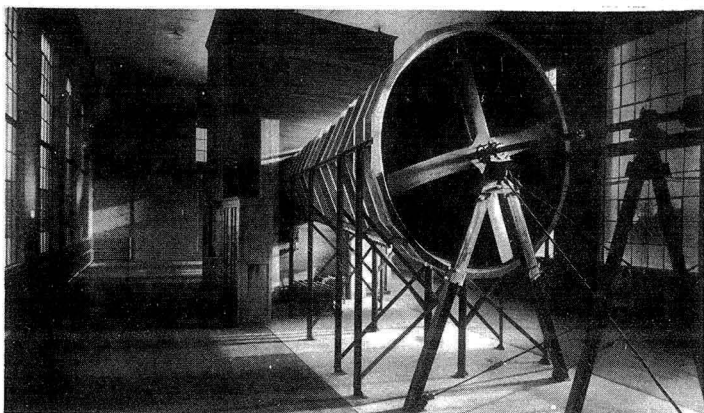
We face new opportunities and responsibilities with the opening of important wind tunnels, laboratories, and facilities in the West Area. Our staff is being increased to meet demands for fundamental research and direct aid to the Armed Forces.

Thus we approach the bigger job of the future, well equipped for our individual and joint tasks. As a team, we are determined that the distinct contribution of the Langley Laboratory to aeronautical research, in war and peace, shall be maintained and increased.

Your own part in this vital work is sincerely appreciated.

John W. Crowley, Jr.
John W. Crowley, Jr.
Acting Engineer-in-Charge

1915-HIGHLIGHTS



This is how the interior of the Atmospheric Wind Tunnel looked at its dedication in 1920.

This March 3, the National Advisory Committee for Aeronautics celebrates its thirtieth anniversary....and how it has grown in those three decades! Starting out as a very undernourished infant with a Congressional appropriation of \$5,000 per year for five years "or so much thereof as may be necessary," it has grown into a towering giant of science that sprawls over three immense laboratories. And it is still growing by leaps and bounds, still carrying on its legal admonition to improve the airplanes of the present and develop the airplanes of the future. Many things have happened in these thirty years. Let's look at some of the highlights.

1915 On March 3, the National Advisory Committee for Aeronautics was established and charged with "the supervision and direction of the scientific study of the problems of flight with a view to their practical solution, the determination of the problems which should be experimentally attacked, their investigation and application to practical aeronautics." The first committee was appointed by President Wilson.

It is interesting to note that the first voucher made out against the Committee's first appropriation was for payment of \$26.67 for clerical services of one John F. Victory. A permanent appointment for the ambitious young secretary soon followed and John Victory is now the oldest employee in point of service of the NACA.

1916 The Committee set about selecting a suitable site for the first NACA experimental laboratory. Acting in cooperation with a board of officers of the U. S. Army which had been inspecting suitable tracts of land for an experiment station and proving ground of the War Department, a site about four miles north of Hampton, Virginia, was chosen, the War Department allotted space for the NACA and a contract for the first Laboratory building was made.

1917 The first Laboratory, now the Administrative Building, was completed and the NACA began to do important research work. Among its first projects was a request from the Navy for a plane with a speed range of 50 to 95 miles per hour and a structural factor of 6. These requirements seem absurdly modest now, but at the time, they were a challenge to the best airplane designers in the country.

This year also found the flames of World War I reaching across the Atlantic and there was a crying need for a good

aircraft engine. The 90 h.p. Curtiss and Hall-Scott engines were not powerful enough, but they were the best America had. Therefore, the Committee called together a conference of representatives of industry to discuss the matter and the NACA brought forth the Liberty engine.

1919 By this time, the Langley Laboratory was fairly well established but terribly understaffed because trained aeronautical research men were few and far between. Scouting expeditions for talent were conducted, and one of the trips to M.I.T. brought Edward Pearson Warner to Langley Field as chief physicist to begin work on wind tunnel design and flight research.

1920 The Atmospheric Wind Tunnel was dedicated on June 11, the first building of the Langley Laboratory to be devoted to research exclusively.

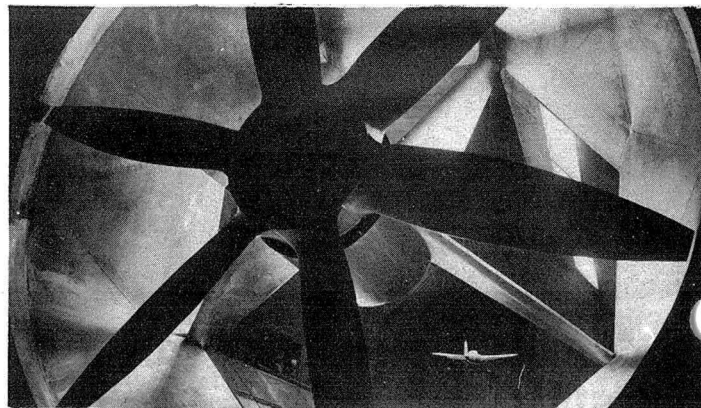
1923 The Variable Density Tunnel joined the growing number of Laboratory buildings.

1925 At the close of this fiscal year, the Laboratory's staff had grown to 105 persons, and the appropriation for the NACA increased in ten years from \$5,000 to \$457,000.

1926 The first of the conferences between representatives of aircraft manufacturers and operators was held at the Langley Laboratory on May 24. At this conference, the Committee was represented by its subcommittee on aerodynamics and members of the Laboratory staff. Dr. Joseph S. Ames acted as chairman. These conferences were held every year until it was necessary to discontinue them for security reasons at the outbreak of the present war, and they were most fruitful in the advancement of civil and military aeronautics.

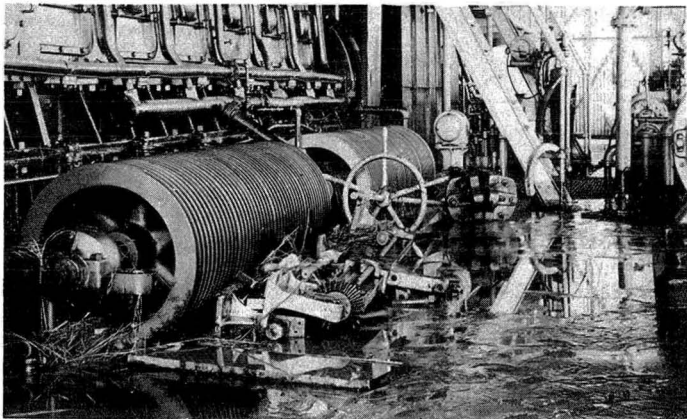
1927 The Propeller Research Tunnel was dedicated on November 30.

1928 Research on the NACA type cowlings, which are used on the airplanes of all countries, was started in this year. The primary research work was done on a wind tunnel full-scale model equipped with a full size engine, and check flights were made in a tri-motor airplane. This radical new improvement increased the speed of the experimental airplane from 118 to 137 m.p.h. when it was perfected.



The world's first free-flight tunnel, used for stability research, was dedicated at Langley Laboratory in 1939.

OF LANGLEY-1945



Scenes of wreckage, like this in the old Diesel power plant of PRT, were common throughout the Laboratory after the 1933 hurricane.

1929 Equipped with NACA cowlings, a twin-engine Lockheed transport flew non-stop across the continent, breaking all records by a wide margin. The cowlings had increased the plane's speed from 155 to 177 m.p.h.

1931 The first full-scale tunnel in the world and Hydrodynamics Tank #1 were dedicated simultaneously on 27.

1932 The Army decided to erect a series of hangars and suggested that the NACA also build one following the Army design. The Flight Research Hangar and Laboratory was the result.

1933 A hurricane swept in from the sea without warning, inundating the entire Laboratory, ruining delicate

instruments and equipment with salt water, destroying the interiors of several buildings and causing tremendous destruction throughout the field.

1934 On Sept. 1 a new engine laboratory was opened. Equipment for it was later moved to the Aircraft Engine Research Laboratory in Cleveland when research reached such magnitude that it could not be handled here.

1935 At this time, approximately half of all airplane accidents were caused by spins. The early experimental work on spinning was done by dropping model planes from the top of the old balloon hangar but obviously, this was a highly inaccurate procedure. Therefore a spin tunnel, following an English design, was built and put into operation on April 3.

1937 The growing importance of the airplane in national defense led to the Committee's recommendation to Congress of a great expansion in scientific research facilities. Congress approved the measure, and construction of of more Laboratory buildings was begun.

9 The pronounced success of the Spin Tunnel in relieving airplanes of undesirable spin characteristics proved the practicability of free-flying models in stability research. Work was therefore begun on a tunnel which would be useful in correcting other aeronautical difficulties and on April 20 the first free-flight tunnel in the world was placed in operation.

1940 The Laboratory expanded into the West Area of Langley Field with the dedication of the West Model Shop and the Structures Laboratory. In the former building, the largest and most accurate wind tunnel propellers in existence were built and in it aircraft modelmakers were first employed on a large scale.

1941 Pearl Harbor struck the Laboratory like a thunderbolt. Immediately work was intensified and precautions taken for security. The badge system of identification was put into effect, door watchers were placed at all entrances, committees were formed for safety during bombings, air raids, etc. and blackout precautions were taken.

Congress increased the limit of the cost of the new Ames Laboratory in California to \$16,207,500 in order to provide for the addition of a high speed, low turbulence wind tunnel, and at last the concentrated aircraft industries of the West Coast had a NACA Laboratory in their own back yards.

1942 The apprentice system for training mechanical workers was put into effect in order to fit young men for advancement in regular trades.

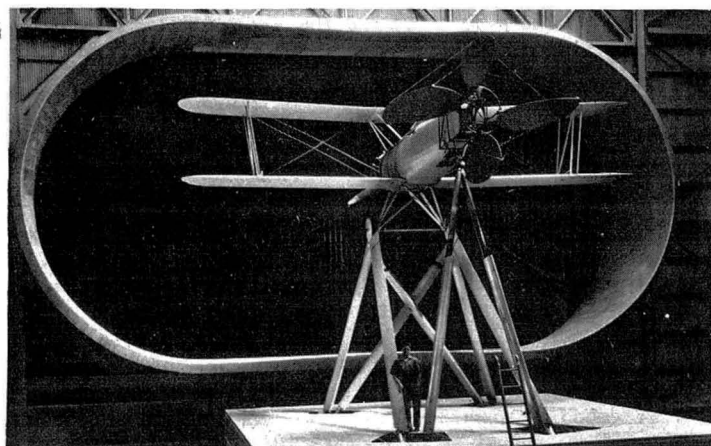
The Aircraft Engine Research Laboratory at Cleveland was officially opened in May and eight new buildings were completed here at Langley including the Impact Basin and Hydrodynamics Tank #2.

1944 Construction was started on the first of more than \$8,000,000 worth of new buildings and equipment for this Laboratory.

A Militarization Plan was put into effect whereby draft-eligible employees were replaced by skilled service men who were over 26 years of age or who had completed their tour of overseas duty.

In September, months of research in ditching procedure at the Impact Basin and the Tanks was climaxed by a full-scale ditching of the B-24 in the James River.

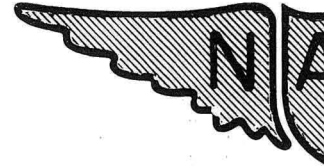
1945 On the thirtieth anniversary of the founding of the NACA the staff had increased to well over 3,000, the original research building at Langley Field had grown into three huge laboratories and the United States, with the help of the NACA, had at last taken its rightful place as the leading air power of the world.



One of the first airplanes tested in the Full Scale Tunnel was this O2U1 equipped with Esnault Peletrie control.



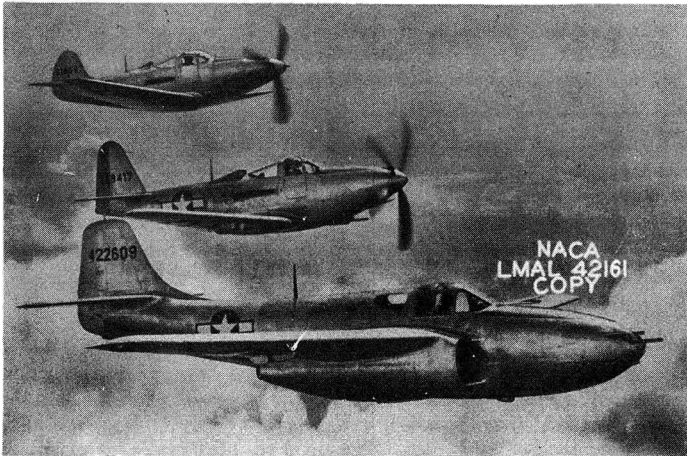
RESEARCH SERVICE



NACA research is playing a significant role in the prosecution of the war against our enemies. Since all of our research facilities now are being employed in work of immediate importance to our armed forces, we can at this time mention only a very few of its many recent research projects.

It must be remembered, however, that our present-day combat airplanes owe much of their superiority not only to current NACA contributions, but also to the results of fundamental research conducted at Langley Field over a long period of years preceding the outbreak of the war. Every air-cooled aircraft engine in service with our armed forces today, for example, is enclosed in a cowling first developed by NACA at this Laboratory more than 17 years ago.

The mark of early NACA technical advances is apparent in many ways on even the latest fighter or bomber. In fact, some aircraft now manufactured in countries no longer granted free access to our technical publications occasionally employ NACA developments which we regard as obsolete. A



A family of Bell aircraft, all graduates of the Langley Laboratory, the P-39, P-63 and the jet-propelled P-59.

high-speed propeller section developed at the Langley Laboratory in 1943 but superseded by superior sections more recently developed here was discovered not long ago on the propeller blade of an ME-110 donated by the Luftwaffe.

However, our enemies employ many trained and capable scientists, and our lead in aeronautical science can be maintained only by continuous scientific advancement. To this end, the three NACA research laboratories have been and are operating at maximum capacity. Within the bounds of security regulations, these pages outline briefly some of the recent developments in the work done at Langley.

IMPROVING THE P-47

When the now-famous P-47 Thunderbolt was first introduced, it embodied numerous features based on the results of NACA studies, and it appeared that the squat, sturdy-looking fighter could easily match the best the enemy had to offer in the way of speed and performance at altitude. It was soon

learned, however, that the P-47 was not to be spared the growing pains that generally plague a new design, however carefully it may be evolved. For although designed as a conventional airplane, the P-47 seemed to possess a strong desire to develop into a flying wing, shedding its tail surfaces at high speeds. The loads on the tail surfaces were at once investigated by the Laboratory and changes were recommended which resulted in increased strength of the tail structure and replacement of the fabric surface covering by sheet metal. Needless to say, the Thunderbolts now in action come home wagging their tails behind them.

After several more modifications in which NACA studies played an important part, the early P-47 still possessed another major shortcoming. It could not roll rapidly enough for a first-line fighter. Again the Laboratory was called on. An important improvement on the aileron design was effected and the Thunderbolt as finally revised became one of the most maneuverable fighters in service.

NACA WORK ON MISSILES AND DITCHING

In recent months, a great amount of publicity has been given to robot bombs and similar missiles, particularly with regard to the German V-1 and V-2 "secret weapons." Although little has been said of American activities along these lines, Congress was recently informed that NACA has been devoting considerable attention to the development of guided missiles. Little more can be said at this time. On the basis of past performance, however, it appears reasonable to predict that NACA contributions to this work will aid appreciably in providing our Army and Navy with missiles superior to any thus far used against them.

Many of our war-time research projects arise from the combat experiences of our fighting forces. If the discovery is made that any enemy aircraft of a particular type are in some features superior to American aircraft, urgent efforts are demanded to make up the deficiencies. The NACA is prepared to meet these emergencies.

An excellent example of such a war-born research problem is that of ditching - emergency landing of a landplane at sea. The ditching characteristics of our combat airplanes - particularly bombers, which are often forced to make long journeys over water - have been studied and improved by the Hydrodynamics Division by means of dynamic-model tests and flight tests.

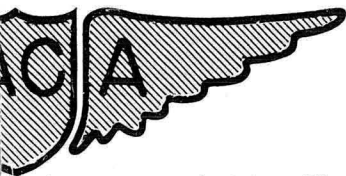
COUNTER-ROTATING PROPELLERS

The advantages of counter-rotating propellers have long been known, but efficient design has been difficult because no adequate theory existed until recently when the Physical Research Division presented a method for the study of this type of propeller. Combining extreme simplicity with extreme accuracy, this method may be applied to any counter-rotating propeller with any number of blades. The use of counter-rotating propellers in both aeronautical and marine work is expected to expand rapidly.

SEAPLANES AND FLYING BOATS

In order that seaplane floats and flying-boat hulls may

to the ARMED FORCES



be constructed with sufficient strength to withstand landing blocks under all conditions - but without unnecessary weight penalties - the water impact loads and pressures imposed upon these structures must be known. In the past, measurements have been made only in landing tests of actual airplanes. Such flight tests have been expensive, dangerous, and of limited value due to uncontrollable conditions of wind and sea - and the human factor of varying pilot technique. Moreover, the available instruments were inadequate to supply sufficiently accurate data.

To overcome the disadvantages of full-scale testing, an impact basin in which float models or actual floats may be tested under controlled conditions has been constructed at the Langley Laboratory. Launched by catapult, the floats are dropped into the water at speeds simulating actual landings, and the measured data are analyzed in terms of full-scale airplane characteristics. Results of the impact-basin tests are expected to provide valuable aid in the design of future seaplanes and flying boats.

AVOIDING COMPRESSIBILITY EFFECT

The problem of avoiding the dangerous compressibility effects that occur when the speed of the airflow about some part of an airplane equals the speed of sound has become increasingly important with the development of higher-speed combat airplanes. The NACA has devoted a great amount of effort to research in this field, and has made significant advances toward minimizing the effects of compressibility.

Some time ago, it was discovered that even with the best forms of NACA cowlings available, compressibility effects on the cowls were encountered at speeds below 350 miles per hour. Studies in the 8-foot high-speed tunnel resulted in the "C-type" cowling now in use on many current high-speed airplanes. This NACA design remains free from compressibility effects up to speeds in excess of 480 miles per hour. Development continued, and now new types of cowls have been designed that do not show the effects of compressibility up to speeds about 600 miles per hour.

Compressibility effects on airfoils are particularly serious because of the airflow separation that accompanies the formation of compressibility shock wave. The "low-drag" airfoils developed at Langley exhibit these effects at speeds much greater than the speeds at which ordinary airfoils are affected. Today practically all of the newer high-speed designs feature the new NACA wing sections.

To permit full realization of the advantages offered by these high-speed airfoils, a method of flush riveting was devised by the Structures Research Division. This method of riveting produces unusually smooth surfaces as well as extremely strong joints.

JET PROPULSION

Unfortunately - or perhaps fortunately - most of the details regarding NACA work in the field of jet and gas turbine propulsion are severely restricted. It has recently been announced, however, that the Bell P-59A jet-propelled fighter has been tested at the Langley laboratories. When

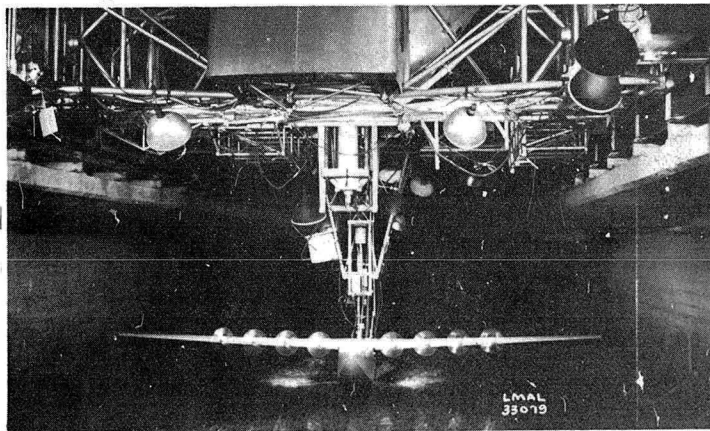
security bans are removed, it will be revealed that NACA has assisted in numerous similar developments.

SUPER-BOMBERS

Also in the confidential category are the studies made by NACA in connection with the development of the Army's new super-bombers. The B-36, described as the largest airplane ever contemplated in this country, has been undergoing extensive tests, as have the B-35 and the B-42. The B-29 Superfortress now performing so well in the Pacific theater is a graduate of the Langley Laboratory.

"CLEAN-UP" TESTS

Achievement of the best possible maximum speed depends largely on the refinement of many design details contributing to the over-all drag of an airplane. Much of this important work has been done in the full-scale tunnel. "Clean-up" tests have been conducted on a large number of airplanes including the P-38, F6F, P4U, SB2C, P-51, and



The towing carriages in two hydrodynamics tanks whisk seaplane models through the water at speeds up to eighty miles per hour.

almost every important military airplane of the past six years.

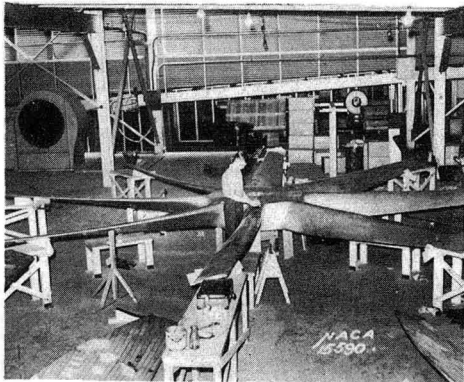
By summarizing the combined results of these individual investigations, the NACA has been able to provide manufacturers with a manual for use as a guide in design. The design improvements made possible by reference to these findings are apparently being incorporated in most airplanes now in production. The initial clean-up tests in the series yielded increases in top speeds as great as 60 miles per hour. More recent designs have shown much less room for improvement. This trend is illustrated by the development of the P-63. The Bell P-39 Aircobra did not live up to the high-speed expectations of its designers until substantial improvements were made on the basis of our clean-up tests in the full-scale tunnel. Using the knowledge gained in the P-39 and similar investigations, however, Bell engineers developed the P-63 Kingcobra which, when tested in the full-scale tunnel, was found to be one of the "cleanest" airplanes ever investigated.

TECHNICAL SERVICES

Langley Laboratory is a "city" of manufacturing shops and office buildings, streets and sewers, power plants and steam plants. The product of this city - its justification for existence - is aeronautical research. But this highly specialized and ever-expanding research requires many special facilities and much complicated equipment. This is the responsibility of the Technical Service Department, largest of the Laboratory's three operating departments.

Let us look into this "city" - and watch the actual progress of just one job.

Right now the 8-foot high-speed tunnel is closed temporarily for installation of a new 16,000-horsepower motor to replace its 8,000-horsepower motor. Our Technical Service job started months ago when representatives from Research and Technical Service began planning the necessary changes involved in this required increase of power. Re-



Huge, multi-bladed propellers of laminated wood are produced in the Propeller Shop for the NACA wind tunnels.

search indicated the requirements as to new recording, balancing, and control equipment, and what stresses would be experienced in the tunnel with the expanded capacity. Technical Service was given the problem, broke it down into component parts, and set its facilities to work to find the solution.

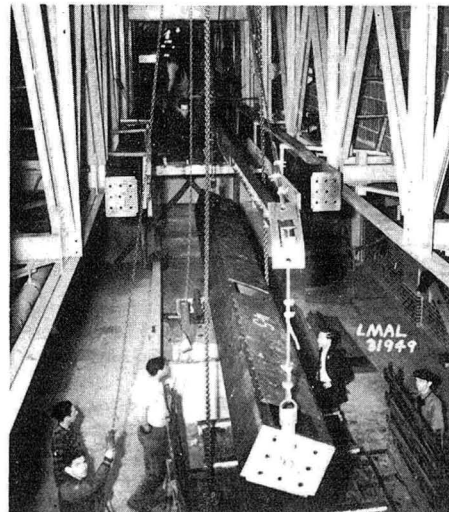
First, the Technical Service planning office, in close collaboration with all of the cooperating sections, established a time schedule and cost estimate. Then engineers and draftsmen of the Engineering and Building and Grounds Sections of the Engineering Service Division developed the necessary designs for plans in collaboration with engineers of the Research Department. These were blueprinted by the Reproduction Section and specifications then were issued by Building and Grounds Section for construction of an addition to the tunnel building.



Making scale models that are perfect replicas of the airplane itself is one of Technical Service's many tasks.

By now the "city" was humming with activity. Drawings were routed to the Shops - patternmakers in the East Model Shop made patterns for castings to be molded by the Foundry, and these castings were then sent to the West Machine Shop for final machining. Instrument makers of the Instrument Service and Instrument Construction Section altered old instruments and constructed new ones after development by the Instrument Research Division.

Meanwhile, the Electrical Shop (of the Mechanical Service Division) was busy designing new controls for operation of the tunnel - aircraft workers



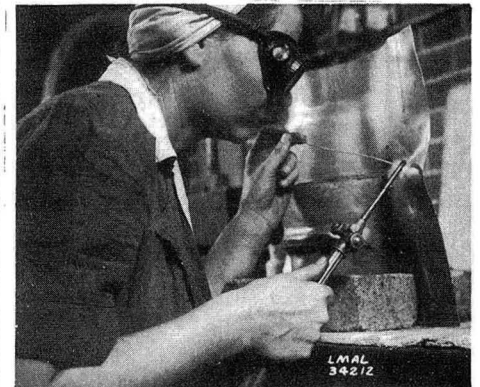
Installing rails in the Impact Basin. All construction and installation work at the Laboratory is done by Technical Service.

in the West Model Shop were constructing new propellers - and metalsmiths in the East Sheetmetal Shop were fabricating, to extremely close tolerances, an improved type of sliding door for the test section of the altered tunnel.

In the Maintenance Division, carpenters prepared forms for concrete foundations - steam fitters ran a high-pressure steam line for cleaning the tunnel - and the Electrical Shop installed temporary wiring for lighting during installation of the new model and propeller.

All of the afore-mentioned work was completed well in advance of the actual shut down of the tunnel. To reduce this shut down to a minimum, the final installation of the new model and propeller is being done by Technical Service personnel working three shifts a day.

This is only a brief and sketchy outline of one problem solved, one service rendered. It serves, however, to indicate how the Technical Service



Women are found in every Technical Service department, skillfully performing tasks formerly done only by men.

organization swings into action to supply Research with the equipment and facilities it must have for its constantly expanding program.

This is just one of the many unique accomplishments of the Laboratory's engineers and mechanics. There is a long list of other new aeronautical research equipment and instruments which have been developed here.

Many of our aircraft modelmakers, aircraft metalsmiths, and machinists - to mention only a few - possess techniques for the fabrication of equipment that can be duplicated only by a relatively few craftsmen in industry. In fact, we usually work through tolerances and specifications seldom encountered in industry. To help develop this craftsmanship, the Technical Service Department established its nationally recognized Apprentice School

ADMINISTRATIVE SERVICES

Paralleling growth in research and in technical service, the Laboratory has required extension of its administrative functions. Today, the work of its male and female employees, varies from routine clerical - stenographic work to special recruiting of new employees - or preparation of special budget analyses - or control of contracts and purchases, for the construction of new buildings and facilities - or coordinated training and supervisory conferences.

Many of the services and conveniences now provided by the administrative department are far removed from those early days of the Laboratory. For example, up through 1923 the Laboratory had no telephone for either inside or outside connection. All long distance or local calls had to be initiated or received at Army headquarters.

Up to 1940 the driver of any car bearing an NACA tag could bring anyone he chose out to Langley Field, the theory being that the driver was responsible for his passengers. Also, there was no "sign-in and sign-out" procedure until March of 1943. Our

first Chief Clerk used to stand, watch in hand, at the window of the administrative building, checking all late arrivals.

In 1923 there were only three people engaged in administrative work; a Chief Clerk, his assistant, and one stenographer. Their combined responsibilities were: files, cost, payroll and purchase, leave and personnel, property accounting, library, and general clerical and stenographic work. Today this department numbers approximately 350.

Through the years 1923-24 employees who wished to cash their pay checks would bring them to the office of the Chief Clerk on pay day. He would cash these checks at a local bank, get back to the Laboratory by 3:00 o'clock and then personally distribute the money to the employees. The semimonthly pay roll at this time amounted to approximately \$4000 compared to the present average of approximately \$330,000.

Near the end of 1924, one of the local banks started sending a representative to the Laboratory on pay days for the purpose of cashing the checks of employees. This service was maintained

until 1935 at which time the State Banking Commission ruled that this service constituted a branch bank operation and was therefore illegal. Arrangements were then made with local banks to stay open late on pay days as an accommodation for Langley employees.

The issuance of badges for Langley laboratory employees was inaugurated in 1925 as a security measure. The type of badge was changed several times until the present picture badge was put into use in 1941.

The rapid rate of Laboratory expansion required the appointment of a Personnel Officer and establishment of a separate personnel office in 1940, the appointment of Procurement Officer and establishment of procurement office in 1941. These functions were later set off as a divisional operation.

In July of 1943 a major change in organization of the entire Laboratory was made. At this time administrative functions were consolidated to form the present Administrative Department, which now has five divisions - Fiscal, Office Services, Personnel, Procurement, and Training.



Supervisory Improvement Conference Leaders: (left to right) E. H. Deering, Paul Taylor, Percy Crain, Myrtle Collins, Joseph Shortal, Joseph Kotanchik, Howard Morris, Walter

Hixon, John B. Parkinson, Philip Donely, Charles Donlan, William Mayo, Edward A. Howe, Elton W. Miller, Franklin Booth, John Munick and Charles A. Hulcher.

TECHNICAL SERVICE

which trains apprentices in 11 different trades used at the Laboratory. This school regularly is turning out journeymen of whom the Laboratory is justly proud.

The men and women of the Technical Service Department work as a team, from the messenger girl to the Chief - a team which knows that 'service is our middle name,' and which is proud of its part in the Laboratory's aeronautical research program, so vital to our war effort.

Other activities and services, which do not happen to be used in this instance, are made available in Technical Service. Modelmakers are continuously making finer finished and balanced scale models for tunnel tests. Engineers of the Instrument Research Division conducting highly confidential program - refrigerating mechanics and maintenance help make possible the testing of models at extremely low temperatures. Also, architectural engi-

neers design and prepare drawings of Research laboratory and shop facilities such as are now under construction in the West Area.

In addition, the department includes such service functions as - artist-illustrators for reports and lectures, telephone service installed and maintained, the Electric Generating Plant which drives the propellers in the wind tunnels - heating plants for Laboratory buildings - carpenters to install doors and acoustical tile and linoleum - watchmen to police the ground - and plumbers to install everything from drinking fountains to high octane fuel lines. The department also provides all the janitorial services for the Laboratory, maintains a fleet of trucks and drivers with a staff of automotive mechanics, provides watch and fire patrol.

In brief, therefore, the Technical Service Department is organized to furnish any and all technical services

required by the Research Department - from airfoils to zygo. Each job is custom-built to the requirements of research. This fact is a constant challenge to the engineers and mechanics of Technical Service to devise new and better means for making better research equipment. It is important to note that most of such work is without precedence in industry.

Wind-tunnel propellers are an excellent example. These are of laminated wood construction, carefully proportioned. Some of them measure 45 feet from tip to tip and development was an accomplishment of this Laboratory, since propellers of such size were not dreamed of in industry and no techniques existed for making them when the first propellers were urgently needed for wind-tunnel research. Very few woodworkers had the skill required for their fabrication. Technical Service met the emergency by training the necessary personnel and turning out the propellers in record time.

CONSTRUCTION PROGRAM

In February of 1944 a new appropriation of over \$8,000,000 was granted to the Laboratory for additional buildings which would increase the facilities for research and development work on warplanes, and this construction has been rushed to completion. Most of the buildings authorized by this appropriation are already operating on a full wartime schedule, and others will soon join them.

When the first research building was dedicated here in 1917, no one could possibly have foreseen that the apparently huge tract of land immediately surrounding it would prove too small to accommodate the Laboratory's growth, but such proved to be the case. By 1940 it had expanded into the West Area of Langley Field with the opening of the West Model Shop, and new buildings are still springing up throughout the site.

At the beginning of the West Area construction program, H. J. E. Reid, Engineer-in-Charge, outlined its purpose. "Our efforts are dedicated," he said, "to improving the performance and safety of our aircraft and thereby not only to helping the Allies maintain air supremacy, but to preserving the lives of thousands of our flyers."

The newer West Area buildings include a physical research laboratory designed to permit expansion of work on a great number of physical problems affecting the efficiency of aircraft, a laboratory for the study of flutter difficulties encountered at high speeds, a tunnel designed to supplement research into the compressibility effects encountered as airplanes approach the speed of sound, and other research facilities of equal importance.

Equipment that has been in use for some time was expanded to meet the critical wartime need. The West Model Shop, for instance, has been greatly enlarged. This shop is utilized for the making of wind-tunnel models, repairing propellers and making precision wooden parts in addition to constructing huge wind tunnel propellers for all three NACA laboratories.

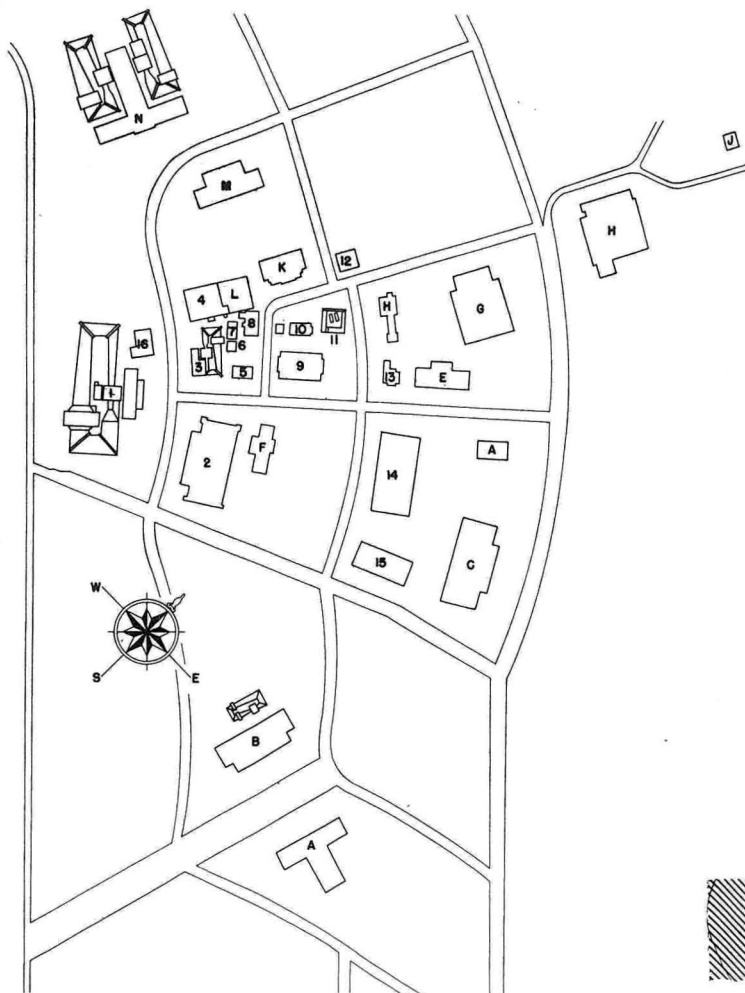
Below is a diagram of the West Area. Buildings indicated by numerals were completed before 1944, those indicated by letters were finished last year and some are still under construction.

WEST AREA BUILDINGS COMPLETED BEFORE 1944

1. 16-Foot High Speed Tunnel
2. Structures Research Laboratory
3. Stability Tunnel
4. West Model Shop
5. West Heating Plant
6. Electric Generators for Stability Tunnel
7. Fuel Storage
8. Foundry
9. Power Plant
10. Cooling Tower
11. Diesel Fuel Storage
12. Impact Basin
13. Model Supersonic Tunnel
14. Warehouse
15. West Shop
16. West Substation

COMPLETED 1944-1945

- A. Electronic Aircraft Instrument Laboratory
- B. Physical Research Laboratory and Flutter Tunnel
- C. Sheetmetal Shop
- D. Building Material Storage
- E. Aircraft Loads Building
- F. Service Building
- G. Aircraft Loads Calibration Laboratory
- H. Gust Tunnel
- I. Induction Aerodynamics Laboratory
- J. Addition to Sewage Plant
- K. New Heating Plant
- L. Extension (West Model Shop)
- M. Electrical Building
- N. Two 7 x 10 Wind Tunnels



NATIONAL ADVISORY
COMMITTEE FOR AERONAUTICS

NEIHOUSE

From page 1



THE WINNAH!

Red (The Wolf) Neihouse

Stability put four men into the contest - Les Schneider, Ray Comenzo, Red Neihouse and Herman Ankenbruck. One of these, however, was disqualified for influencing the machine by strapping a number of storage batteries around his waist to induce additional current. This person has since been exiled to a remote island in the West Area.

The challengers included Axel Mattson of 8-Foot, Jerry Teplitz of 19-Foot, John Houbolt, Structures, Bunny Klawans, Flight Research, and Ken Paulovich a visiting representative from Consolidated Aircraft.

According to the Impulseometer, Neihouse won by a comfortable margin, and while the accuracy of the machine is unquestioned, doubt was expressed in some quarters about the eligibility of the winner. The principal objections were (1) that Neihouse was married to his co-contestant and some breakdown of resistance in advance of the bout can be presumed and (2) that Neihouse is head of the Spin Tunnel, acknowledged hangout of artists in the art of osculation, and he therefore was able to receive expert coaching for many weeks preceding the contest.

NEW STAMP CLUB TO MEET MARCH 6

The first official meeting of the newly organized stamp club will be held next Tuesday evening, March 6, from 7 to 10 p.m. at the Symes-Eaton Recreational Center, Hampton. The actual business meeting will start promptly at 8 p.m. and the time before

after the business transactions may be used for swapping stamps, comparing collections, etc. Officers will be elected Tuesday, a name for the club will be selected and the constitution and by-laws will be drafted.

LIFE at the LABORATORY

Dan Cupid's latest victims are Bennet Reed, West Machine Shop, and Kitty Palmer, West Area Dispensary. Plans are underway for a June wedding.

Clo Wood, Flight Research will put his ring through Flossie Timberlake's nose, on Tuesday, March 6 at the First Methodist Church, Hampton. Attendants will be Buz Walters, and Pat Patterson, bridesmaids; Helen Wheary, mistress of Ceremony; Don Talmage, best man; and Chuck Matthews, Fabian Goranson, Sig Sjoberg, and of course Jack Paulson, ushers.

Washington's birthday was the date of the monthly fling of the Technical Service Office held at the home of Anna Cummings. The only complaint of the evening came from Frank Penland who didn't get enough shrimp.

The purchase Office has been in a stew ever since Zena Sichert's husband returned after three years overseas and Anne Carmine received word that her finance, Charles Ransdell, will arrive in the States this week.

A truly bouncing baby boy is the new addition to the family of Charles Davidson of the Photo Lab. The baby, who weighed in at 14 pounds, was born on February 19 and will be named Charles Seater Davidson. Papa Davidson is now looking for some king-size cigars to pass around.

Aw, heck, I can't think of any new ways to say it. Janie Simon, Purchase Office, married Jack Calvin last Sunday.

SPORTS

Flight Blues overcame their last big obstacle on the way to an undefeated season by dropping 19-Foot, 24-9, last Wednesday at Langley View.

Frank Liberatore led the Blues, scoring with 6 points in one of the most listless and uninteresting games of the season. The winners' air-tight defense kept 19-Foot out of range and for the only night of the year, Pat Cancro's shooting eye was off.

The Blues have only Loads and PRT to play with the protested game with IRD still in the balance.

Standings:

Team	Won	Lost	Pctg
Flight Blues	11	0	1.000
Low Turbulence	9	2	.818
East Shops	7	3	.700
AWT	6	3	.667
19 P.T.	7	4	.636
Structures	8	5	.615
8' HST	6	5	.600
ALD	6	5	.545
PRT	5	5	.500
IRD	5	5	.500
Free-Flight	5	7	.417
Tank	2	8	.200
West Shops	2	9	.182
16-Foot	1	8	.111
Flight Whites	0	12	.000

Player	Team	G	FG	F	IP	Avg.
Rice	LIT	11	56	23	135	12.3
Polhamus	AWT	9	53	3	109	12.1
Cancro	19'	11	49	11	109	9.9
Bennett	FFT	11	34	16	84	7.6
Anderson	Str.	12	35	9	79	6.6
Lates	AWT	9	29	14	72	8.0

SCORES:

FFT 18, West Shops 16
ALD 19, Flight Whites 17
Flight Blues 24, 19' P.T. 9
AWT 34, Flight Whites 11
Low Tur. 37, West Shops 9
8' HST 19, 16-Foot 13
Tank 42, Flight Whites 12
Low Turb. 54, PRT 17
PRT 26, Tank 25
IRD 33, Loads 22
FFT 20, Structures 18

MEET THE COMMITTEE

An important peacetime function of the NACA is the improvement in the efficiency and safety of aircraft for commercial use, and though this function must, of course, be superseded by military needs in time of war, it is still vitally necessary that the Committee be advised constantly of the present and future requirements of air transport. In order to accomplish this, William Littlewood, Vice-President in charge of Engineering of American Airlines, Inc., and an outstanding authority on commercial aviation, was appointed by the President a member of the National Advisory Committee for Aeronautics in February 1944. He is Chairman of the important Committee on Power Plants for Aircraft of the NACA and is also a Vice-President of the Society of Automotive Engineers and chairman of several of their important sub-committees.

William Littlewood has spent fifteen of his forty-six years as a top airline executive. He has watched and helped commercial transport grow from a meagre number of scheduled flights in 1930 to a network that now covers not only this country, but foreign lands as well. And his extensive engineering background makes him especially sensitive to aeronautical progress.

Littlewood is one of the many outstanding products of Cornell University. While at the university, he chalked up a scholastic record that is still a challenge to budding young engineers. He assisted on the staffs of the Physics, Mechanics and Machine Design Departments and was awarded, for two consecutive years, the coveted Sibley prize for the highest rating in Engineering. And at the beginning of his Junior year he was elected to membership in Tau Beta Pi, national engineering honorary society.

After his graduation with a Masters degree in engineering, Littlewood became assistant superintendent of the Pond Works of Niles-Bemont-Pond, manufacturers of machine tools, and later joined Ingersoll-Rand as inspector and assistant shop superintendent. He remained with this company until 1927 when he entered the field of aviation.

His first job in the aircraft industry was production manager of Fairchild-Camenz - later Fairchild Engine Corp. - and his work was ideally designed to give him an intimate knowledge of engines and instruments that was to prove invaluable later both in his airline work and his activity with NACA. He was instrumental



WILLIAM LITTLEWOOD

in engineering and building the famous Camenz "Cam" engine, he produced the American version of the Armstrong Siddeley "Genet" and encouraged the production of the Wright-DeHaviland "Gypsy" in the United States. He also helped develop and build the first Ranger aircraft engines.

In 1930 he joined the Engineering Department of American Airways (predecessor of American Airlines), and immediately started to work on the problems of making air transport economical, practical and safe. Safety was, and still is, his particular passion. He has worked tirelessly on the improvement of engines and airplane design and is largely responsible for the remarkable safety record of today's airlines. And he eagerly awaits the post-war era when wartime developments can be applied to transport planes to make them fly higher, faster, more efficiently, and with a greater margin of safety than those in use today.

Littlewood became American Airlines' chief engineer three years after he joined the company and was made Vice-President in charge of Engineering in 1937.

In 1935 he received the Wright Brothers award of the Society of Automotive Engineers for his paper on "Operating Requirements of Transport Airplanes." He is a very active member and past vice-president of this Society and serves as Chairman in charge of Air Transport Engineering, Chairman of the Aircraft Accessories and Equipment Sub-division and the Clarkson Memorial Committee.

★ ★ ★

LOST: Lord Elgin man's wrist watch. Left in men's washroom in Administrative Building. If found, please return to Elwood Wilcox, Files.

COW

Continued from Page 1

avoring around to the melodious melodies of Red Overton and his Heifer Hepcats, Solid, Jackson. Whereupon Harry Shoaf and Don Talmage moomed a beautiful duet of "Milkman, Keep Those Bottles Quiet" and danced off together, swishing their tails behind them.

At this point, Publicity Specialist Jerry Kayten dashed up and handed the each of the reporters present his daily news release of 1765 pages, all complete and to the point about the first dance. "It's gonna be terrific," he panted, plaiting Pitkin's long tresses, "It's gonna be superterrific," he added, cutting in on Talmage and Shoaf and dancing around with himself, "It's gonna be extra-double-and-more-than-that-terrific," he screamed as he threw down six straight chocolate milks, "It's even gonna be pretty good," he cried, "I can't stand it; somebody give me another drink, Make it the same!"

"G.I. BILL OF RIGHTS" SUBJECT OF FORUM

Another "Home Front Forum" sponsored jointly by the USO Council and the American Legion Auxiliary will be held on March 9 at 8 p. m. in the auditorium of Newport News High School. The forum, which is presented entirely without charge, will feature a discussion and outline of the G. I. Bill of Rights. Harry W. Colmery, Past National Commander of the American Legion, will be the principal speaker.

A representative of the Governor of Virginia, Dr. R. V. Long, Director of the State Planning Board, will also speak on what Virginia is doing, and will do, to cooperate with the G. I. Bill of Rights.

The sponsoring bodies believe that this forum will assist civilians in understanding the problems and privileges of returning service men and women, and will give persons now in the service a clearer idea of the benefits to which they are entitled after being discharged.

EX-G.I.'S INVITED TO LEGION DINNER MARCH 7

Newport News Post #25 of the American Legion urges all the ex-service men who have come to NACA to attend the dinner sponsored by the Legion. The dinner will be held at Braxton Perkins Post #25, 219 27th St. Newport News on Wednesday, March 7, and speakers will include G. K. Linkaus, State Commander, and M. Charles Ford, Post Commander.

All veterans are invited, whether they are members of the American Legion or not, and elaborate plans for the evening have been made. The dinner will be a real Italian affair prepared by Legionnaire Joe Farry.

LOST: On Feb. 22 in Physical Research Building. A watch of considerable sentimental value. Finder may pawn watch in my name and mail ticket in a plain envelope to John L. Bruce, 7 Mitchell Road, Hampton, Va.