

● PSF: Subj. File: Aviation

1938-39

MISSY:

Private file - inside office.

F.D.R.

Committee on Study - /

Army list lines - /
Lt. Col. Mason - 114
Col. H. H. Arnold - 114

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EXECUTIVE ORDER

Organization of Executive Agencies.

WHEREAS, Section 16 of the Act of March 3, 1933 (Public No. 426, 47 Stat. 1517), provides for reorganizations within the executive branches of the Government; requires the President to investigate and determine what reorganizations are necessary to effectuate the purposes of the statute; and authorizes the President to make such reorganizations by Executive order; and,

WHEREAS, I have investigated the organization of all executive and administrative agencies of the Government pertaining to aeronautics and have determined that certain re-groupings, consolidations, transfers, and abolitions of executive agencies and functions thereof are necessary to accomplish the purposes of Section 16;

NOW, THEREFORE, by virtue of the aforesaid authority, I do hereby order that:

Section 1. Creating the Air Administration and the Position of Director Thereof. - Pending the enactment of permanent legislation by the Congress creating an executive Department of Air to more adequately provide for the national defense, there shall be created the Air Administration, the head of which shall be known as the Director of the Air Administration, who shall report directly to the President.

Section 2. The Transfer of Property, Equipment and so forth to the Air Administration. - There is hereby transferred to the Air Administration all property, equipment, office furniture, records, papers and libraries, installations and funds pertaining thereto, of the following agencies of the Government: The Air Corps of the War Department, The Bureau of Aeronautics of the Department of Commerce, and The Weather Bureau of the Department of Agriculture.

Section 3. Assignment of Military Personnel to the Air Administration.- All commissioned officers, including reserve officers now on active duty, warrant officers, enlisted men, and flying cadets in the Air Corps, as created by the National Defense Act approved June 3, 1916, and as amended March 4, 1929, are hereby detached from duty in the War Department and assigned to duty with the Air Administration.

Section 4. Transfer of Civilian Employees to the Air Administration. - All civilian employees of the War Department, the Department of Commerce, and the National Advisory Committee for Aeronautics, engaged in or on duty exclusively pertaining to aeronautics, and all civilian employees of the Weather Bureau of the Department of Agriculture shall be, and are hereby, transferred to the Air Administration at their present grades and salaries; PROVIDED, that all laws prescribing work and defining duties of the several

corps, offices, bureaus, divisions, and branches by this Order transferred or assigned to and made a part of the Air Administration shall, so far as the same are not in conflict with the provisions of this order, remain in full force and effect, to be executed under the direction of the Director of the Air Administration.

Section 5. National Advisory Committee for Aeronautics. - That body which is now known or which heretofore has been known as the National Advisory Committee for Aeronautics is abolished as such, and its organization, personnel, property, and all funds and obligations are hereby transferred to the Air Administration and the Director of the Air Administration is authorized to hereafter control and direct the activities previously carried on by this body as to best serve the aeronautical interests of the United States and the Air Administration.

Section 6. Organization of the Air Administration. - The Director of the Air Administration is hereby charged with the regrouping, consolidation and reorganizing in the Air Administration of the agencies as listed in Sections 2, 3, 4, and 5, above.

Section 7. The provinces and Duties of the Air Administration. - It shall be the province and duty of said Air Administration, to foster, develop

and promote all matters pertaining to aeronautics, and the Air Administration shall assume all functions and perform all duties heretofore assigned to the War Department, the Department of Commerce, in times of peace and war insofar as they relate to aeronautics, which shall include the responsibility for aerial defense of the United States and its foreign possessions, to include air operations off the coasts and beyond the frontiers to the limit of the radius of action of aircraft; the supervision and establishment of all airdromes, airways and landing fields under the jurisdiction of the Air Administration, and the supervision of those used for commercial purposes.

Section 8. Furnishing Air Services to Governmental Departments. - Upon the request of the Secretary of any governmental department, the Director of the Air Administration is authorized to furnish to that department, air services, the cost of which shall be adjusted by interbureau transfers of funds to cover actual costs without overhead of such services.

Section 9. Preparation and Submission of Estimates. - That the Director of the Air Administration shall be charged with the preparation of all estimates covering the entire cost of the Air Administration and shall submit such estimates directly to the Director of the Bureau of the Budget.

Section 10. Furnishing of Supplies and Services to the Air Administration. That upon request of the Director of the Air Administration, other branches,

bureaus, and departments of the government shall continue to furnish the necessary supplies and services for the Air Administration that have previously been furnished the various agencies hereby transferred or assigned to the Air Administration, and that the costs of such services and supplies for the Air Administration by other supply and technical branches, bureaus, or departments of the government shall be adjusted by inter-branch, inter-bureau or inter-departmental transfers of funds to cover actual costs without overhead of such supplies and services.

Section 11. Transfer of Balances of Appropriations, Appropriations, Equipment, Functions, and so forth, to the Air Administration. - That all balances of appropriations unexpended at the time this order takes effect, and all funds which may be appropriated by Congress in relation to the various offices, bureaus, divisions, and other branches of the public service which shall by this order be transferred or assigned to or included in the Air Administration, or which may hereafter, in accordance with the provisions of this order, be so transferred or assigned, and such proportionate part of any unexpended balances of appropriations or such funds as may be appropriated by Congress, as the War Department, the Department of Commerce, the Weather Bureau of the Department of Agriculture, and the National Advisory Committee for Aeronautics, or any other department

would have been authorized to expend for purchase of supplies and equipment and for the pay, additional pay, and allowances on account of officers, enlisted men, and civilian employees assigned or transferred to the Air Administration by this Order, including medical attendance, transportation, housing, subsistence, clothing, and any other items not specifically set aside for aeronautical purposes, shall become available, from the time of such transfer or assignment, for expenditure in and by the Air Administration and shall be treated the same as though said branches of the public service had been directly named in the laws making such appropriations as part of the Air Administration, and expendable under the direction of the Director of said Air Administration, and all obligations of each of such departments, bureaus, divisions, and other branches of the public service in relation to aeronautics shall concurrently become obligations of the Air Administration. The Secretary of War, the Secretary of Commerce, and the Secretary of Agriculture shall, and are hereby directed to, transfer and deliver to such agents of the Air Administration as the Director thereof may designate, all aircraft, all means of transportation, including boats, and automobiles or other vehicles now in use or on hand, or being procured, and all material and parts, and all machinery, appliances, and equipment held for use for the maintenance thereof, all lands,

airdromes, docks, wharves, buildings, repair shops, depots, warehouses,
and all other property and equipment heretofore used by the Department of
War, Department of Commerce, and the Department of Agriculture in connection
with the development, operation, maintenance, repair and manufacture of
aircraft, and in connection with the preparation and distribution of
meteorological data, or procured and now held for such uses, by or under
the jurisdiction and control of these departments or agencies.

And each and every function, authority, power, duty, and jurisdiction
of whatsoever character it may be, in so far as it relates to aeronautics,
now vested in the head of the executive department from which said corps,
office, bureau, division, or section, or other branch of the Government is
to be transferred or assigned, shall, to the extent which said function,
authority, power, duty, or jurisdiction pertains to said corps, office,
bureau, division, section, or other branch of the Government, immediately
upon said transfer or assignment become vested, and hereafter remain
vested, in the Air Administration.

Section 12. Effective Date.- In accordance with law, this Order
shall become effective sixty-one days from its date, unless Congress shall
by law provide for an earlier effective date of this Order.

15F. 2. 1. 1. 1.

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THE GENERAL HEADQUARTERS AIR FORCE

Lecture before

The Army War College

by

Major General Frank M. Andrews, Air Corps,

Commanding

the General Headquarters Air Force,

October 1, 1938.

Presidential Document Library

FRANK M. ANDREWS

15F. 2. 1. 1. 1. (9/27/68)

Date: 4-22-66

Signature:

Carl T. Spicer

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At the outset of my talk, I should like to make it clear that the data I shall present pertain only to the GH₁ Air Force; and should not be confused with data already presented to you concerning the Army Air Corps as a whole.

As you know, the GH₁ Air Force is that part of the Army combat aviation in the continental United States which, in March 1935, was organized as an independent striking force to operate directly under the Chief of Staff. The War Department objective was an air force as recommended by the Drum and Baker Boards: 5 bombardment, 4 pursuit, and 3 attack groups; with 6 reconnaissance squadrons; a force of approximately 1,000 airplanes. There were assigned initially, a total of 44 combat squadrons. Some squadrons assigned were inactive, and some were school squadrons which were later withdrawn. All active units were skeletonized in equipment and personnel.

SLIDE 1 - MAP OF UNITED STATES SHOWING GEOGRAPHICAL DISTRIBUTION OF UNITS:

The GH₁ Air Force today consists of three Wings, comprising a total of nine groups, and 4 reconnaissance squadrons, with six air bases; all echelons at reduced strength. This slide shows the location and tactical assignment of existing units. The Headquarters GH₁ Air Force and the Headquarters 2nd Wing are at Langley Field. The 1st Wing at March Field, Riverside, California, and the 3rd Wing at Barksdale Field, Louisiana. Wing units are distributed as shown on this slide.

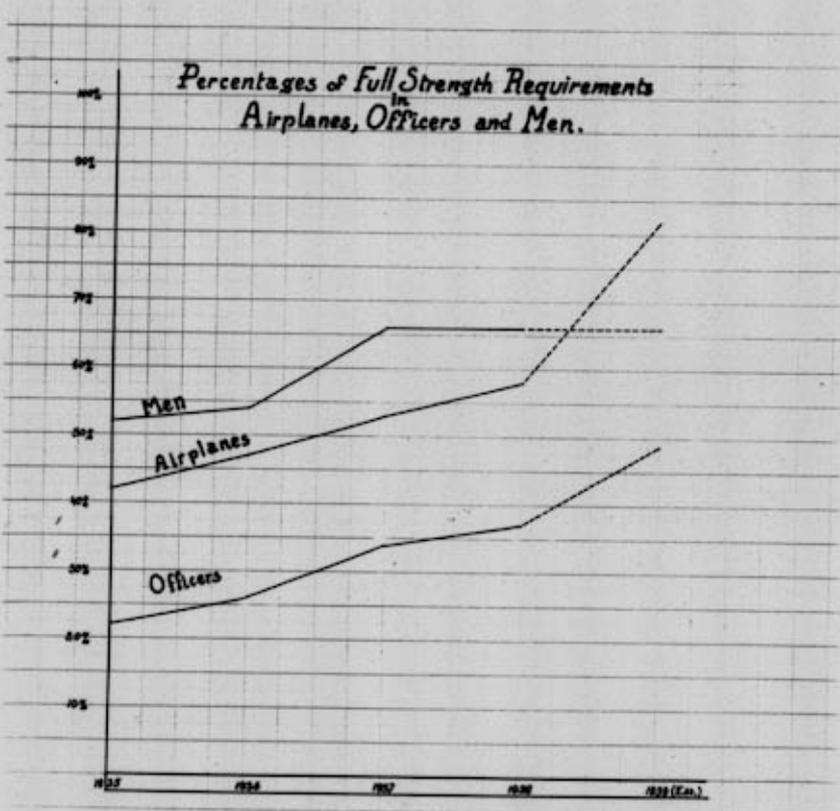
C O N F I D E N T I A L

All groups consist of three combat squadrons, except the two West Coast bombardment groups, which contain only two squadrons each. The total combat squadrons now number 29, all at reduced strength. Location of units has no geographical significance in the sense that our armies have. The First Wing, in the West, for instance, has no connection with the 4th Army, except insofar as set up in a particular color plan.

There are no approved Tables of Organization for the GHQ Air Force. Personnel estimates are based on functional requirements. Each component has been analyzed to determine the number of men required for each function. From this careful job analysis, the revised plan of 739 airplanes for the GHQ Air Force will require 2,014 Air Corps officers and 10,523 Air Corps enlisted men. This does not include the personnel of other branches, such as Signal, Ordnance, Quartermaster, Chemical Warfare, and Medical; all important members, necessary to the efficient operation of the Air Force.

SLIDE 2 - YEARLY STATUS OF EQUIPMENT AND PERSONNEL:

This slide gives a graphic representation of the change in the status of personnel and airplanes, from year to year. We had on hand on June 30, 1935, 53% of the required 10,523 Air Corps enlisted men; 23% of the required 2,014 Air Corps officers; and 42% of the required 739 airplanes. The change in each of these during the successive years is readily apparent. The solid lines are based on actual figures; the



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broken lines, on estimates for the coming year. Airplane strength and enlisted strength have been in fair balance up to the present year. Note that deliveries of new airplanes during the current year will cause a shift in the balance between men and equipment, creating a condition where an insufficient number of men will be available. The officer strength has always been badly out of balance. This lack of balance between personnel and equipment is one of the current War Department problems. A shortage which does not appear in the figures shown is that obtaining in troops other than Air Corps. At present, it is necessary to detail over 500 Air Corps enlisted men to make up for these shortages. The Quartermaster Corps, for example, furnishes about 40% of the men required to carry out its functional responsibilities. The Ordnance Department and the Medical Corps are the only services, at present, which do not require extensive help. It is evident that the effective strength of the GHQ Air Force is not measured in terms of available airplanes, but in terms of officers and men.

The GHQ Air Force organization for service, supply, and administrative functions is built up around the Air Base. This is defined, in Training Regulations 440-15, as "a command which comprises the installation and facilities required by and provided for the operation, maintenance, repair and supply of a specific Air Force. An Air Base will, as a rule, cover a considerable area, especially if the installations and facilities must be dispersed because of terrain, security, or other considerations".

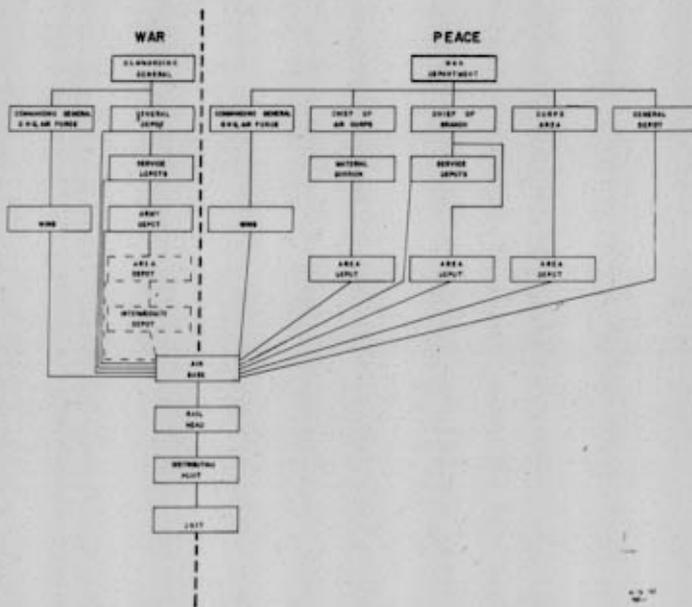
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The operation of the GH₄ Air Base system, during the past three and a half years, has demonstrated that combat units can be relieved, to a great extent, from the responsibilities of housekeeping, supply, and maintenance; thus freeing them to accomplish their tactical functions. Each GH₄ Air Base has been organized to take over the bulk of administrative duties required for the operation and maintenance of combat units normally stationed on its airdrome; and, in addition, with reinforcement from other bases, to provide service and supply within its area for all or any part of the GH₄ Air Force.

A typical Air Base comprises a base airdrome, at which are located repair shops, warehouses, and facilities for such essential services as medical, transportation, ordnance, maintenance engineering, technical supply, parachute maintenance, photography, weather, communications, bombing and gunnery ranges, and so on. In addition, the Air Base command includes jurisdiction, for planning purposes, of enough of the surrounding area to include a number of commercial airdromes sufficient to accommodate other GH₄ Air Force units that may be concentrated in that area. In time of war, most combat squadrons, for sake of security, will operate from individual airdromes; thus it will be seen that the task of the Air Base requires considerable logistical planning.

SLIDE 3 - THE GH₄ AIR FORCE SUPPLY SYSTEM:

This slide shows the GH₄ Air Force supply system. As you see, the Air Base acts as a clearing house for supplies furnished by the regu-



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larly established depots of the Army supply system. The Air Base establishes the railheads and distributing points not shown on the chart necessary for the flow of supplies to the tactical units, and organizes a Distributing Joint party for each airdrome to be occupied. These D.I. units are highly mobile and go to the airdrome in advance of tactical units, in order to make all necessary arrangements regarding ground installations, utilities, and supply. Through such an organization, the impetus of supply is really from the rear.

The most important aspect of the Air Base system is strategic. One of the principal reasons for the creation of the GH₄ Air Force was to increase the strategic mobility of the combat air units in continental United States, that is, to facilitate their concentration in any given theatre: - the airplanes flying thereto with their combat crews, and the non-flying echelons, including reinforcing base personnel, being transported by the most expeditious means to the air establishments in that theatre. Such mobility is possible only if an efficiently organized air base exists in each strategic area. Hence, it is important that, in addition to existing Air Bases, provision be made for Air Bases in the Atlantic northeast, the Atlantic southeast, and the Alaskan area; - three strategic areas in which such facilities are at present lacking.

In the matter of equipment, the airplanes on hand, plus those being delivered to GH₄ Air Force units during the current fiscal year,

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will, as already noted, exceed our operating capacity in available personnel. The next four slides show the numbers and types of airplanes on hand at the end of the year ending June 30, 1938. To give you some idea of what we expect in the way of new equipment during the current year, there is shown on each slide an estimate of the numbers and types with which units will be equipped on June 30, 1939.

SLIDE 4 - PURSUIT EQUIPMENT:

<u>PURSUIT AIRPLANES</u>		
<u>Single Seaters</u>	<u>6/30/38</u>	<u>6/30/39 (Est.)</u>
P-6 Curtiss	17	0
P-26 Boeing	43	0
P-35 Seversky	53	0
P-36 Curtiss	1	205
P-37	0	12
	<u>114</u>	<u>217</u>
Number of Squadrons	6	3
Average Airplanes per Squadron	10	24
<u>Two-Seaters</u>		
FB-2 Consolidated	30	0
FM-1 Bell Fighters	0	12
Number of Squadrons	3	1
Average per Squadron	12	12

From this slide, it will be seen that deliveries of Curtiss P-36's during the coming year will re-equip practically all single-seater units in the GHQ Air Force. Attention is invited to the difficulty of keeping

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tactical units equipped with the latest in airplane development. Within a year we anticipate a complete turnover of pursuit equipment in order to provide our units with a 300 mile-an-hour airplane. This shows the marked annual progress that is to be faced in aviation. No nation can afford to be static in development and procurement.

This slide also shows the increase in squadrons and squadron equipment in single-seat pursuit. The decrease shown in two-seater squadrons and the number of two-seaters is not so much a condemnation of this type of equipment as it is a lack of a suitable available type of airplane for those units.

The introduction of twelve A-37's in the second column in 1939 indicates that due to the lag in production the new and faster model is beginning to be delivered. The performance of the A-37 overshadows that of the A-36, and is in a class with the British Spitfire and the German Messerschmidt, which are capable of around 350 miles per hour. Thus, before production can be well launched on the 205 A-36's, new procurement must, and has been, started on an advanced and succeeding model.

SLIDE 5 - ATTACK EQUIPMENT:

<u>ATTACK AIRLINES</u>		
	<u>6/30/38</u>	<u>6/30/39</u>
<u>One Engine type:</u>		
A-17 Northrop	115	
Squadrons	6	Same
Average per Sq.	10	as
		in
		1938
<u>Two Engine type:</u>		
A-13 Curtiss	12	
(1 Sq. only)		

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No change is anticipated in the Attack type during the coming year. The A-17 has no bomb sight, and no demolition bombs suitable for use at low altitudes are available; consequently its usefulness is limited. The A-10 two-engined type is still in the service test stage. It is highly probable that attack missions as now visualized will be performed in the future by pursuit and light bi-motored airplanes.

SLIDE 6 - RECONNAISSANCE EQUIPMENT:

	<u>RECONNAISSANCE AIRPLANES</u>	
	<u>6/30/33</u>	<u>6/30/39</u>
B-10 Douglas	19	36
Ambassadors	5	4
	24	40
Squadrons	4	4
Average per Squadron	6	10

The B-10 airplanes used in these four Reconnaissance Squadrons are identical with those used in bombardment squadrons. By carrying a full load of fuel instead of bombs, its range is around twelve hours; which permits reconnaissance to a depth of about 600 miles. This is often insufficient in coast defense and other situations.

SLIDE 7 - BOMBARDMENT EQUIPMENT:

	<u>BOMBARDMENT AIRPLANES</u>	
	<u>6/30/33</u>	<u>6/30/39</u>
Four Engine Bomber		
B-17 Boeing	12	24
Squadrons	3	3
Average per Squadron	4	3

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SLIDE 7 - BOMBARDMENT EQUIPMENT (Continued)

<u>Two-Engine Bomber</u>	<u>6/30/33</u>	<u>6/30/39</u>
B-10 Douglas	38	132
B-10B Martin	24	0
	<u>107</u>	<u>132</u>
Squadrons	9	9
Average per Squadron	10	13

There are on order enough additional B-17's, the so-called "Flying Fortress", to bring the total in the Air Corps to 52; though all deliveries are not scheduled by the 30th of June, 1939. Note that the bulk of bombers in the GH Air Force will be the two-engined Douglas.

Performance data on the various types of airplanes with which the GH Air Force is equipped have already been presented to you. I shall therefore confine myself to some comments on their performance from an operating standpoint. Pursuit interception of other types is mainly dependent upon an adequate aircraft warning service. It is manifestly impracticable to maintain a sufficient force of pursuit in the air at all times. Therefore, the bulk of our fighters should be rapid climbers of great speed. Pursuit action against other types of aircraft is usually a series of quick attacks and withdrawals. Consequently, as great a differential as possible in their speed over these others is important, to make as many attacks as possible. Our aim is to build pursuit planes with one-third more speed than possible to other current types.

In bombardment, reconnaissance, and attack (which is singly light

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bombardment), we require speed, bomb capacity, radius of action, and defensive gun fire. With improved pursuit and increased effectiveness of ground gun fire, ceiling offers great additional protection and security.

I have long been strongly impressed with the value to our National Defense of large capacity, high performance bombers. While light and medium bombers may have all the range necessary for the air defense problems of nations contiguous or near to each other, they do not have the range capabilities required in our particular situation. The fortunate isolation of this country constitutes one of the principal elements of its defensive strength; our defensive weapons should capitalize this isolation, to the utmost. A considerable percentage of our bombing airplanes should be capable of striking an enemy at such a distance from our shores that he will be unable to bring his forces close enough to conduct effective operations against us, without being in danger of decisive losses. In this connection, a consideration of radius of action is interesting. For example, let us consider the B-17; erroneously referred to by some as a "3,000-mile bomber".

It is true that it can go from one point to another point, 3,000 miles distant, under favorable conditions, at an economical speed and with 2,500 pounds of bombs; but, tactically, it is only capable of operating to a distance of about 750 miles.

This may seem to be an extremely conservative estimate of radius

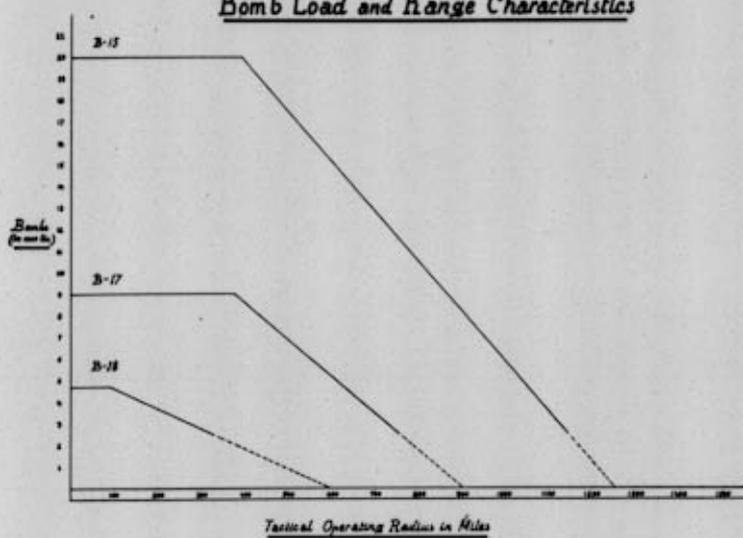
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of action; but when all factors affecting tactical operations are considered, the accuracy of this statement becomes apparent. To enumerate some of these factors: the take-off with a full load requires high power operation for some time, entailing heavy fuel consumption; allowance must be made for winds, which always reduce radius of action; return to a more inland air base may be necessary in order to avoid coastal fog conditions (in an exercise with the Navy in 1937, some of our bombers which took off from Oakland in the afternoon had to land at Sacramento that night due to fog coming into Oakland while they were out); some allowance must be made for time to search for the target; full speed -- which means heavy fuel consumption -- must be employed as a protective measure when near the target, or when attacked by hostile pursuit; allowance must be made for a suitable fuel reserve. All of these factors must be considered in arriving at the tactical radius of operation. This TRO is roughly one-fourth of the engineering figured straight-line distance the airplane can fly, in still air, with the military load for which it is designed.

SLIDE C - TACTICAL OPERATING RADII:

This slide gives a good picture of the comparative bomb loads and TRO of the B-10, the B-17 and the B-15. It shows why we consider the B-17 as a medium, rather than a heavy bomber. On the left, we see the maximum bomb loading of which these airplanes are capable; the B-10 at 4,700 pounds; the B-17 at 9,000 pounds; and the B-15 at 20,000 pounds. With these loads the TRO's are: 90, 375, and 390 miles respectively.

Bomb Load and Range Characteristics





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For greater range, the bomb load must be reduced in order to carry more fuel. If each type carried 2,500 pounds of bombs, their TAO's would be 330, 750, and 1,150 miles respectively. The dashed lines are projected to show the maximum distance to which the airplane could operate on reconnaissance missions, without any bomb load, and with full carrying capacity utilized to carry fuel.

The flexibility of the large bomber in fire power and range can be readily visualized. The close support mission with enormous bomb loads is only one condition of operation that can be varied in multiple combinations of bomb capacity and range until the other extreme is reached wherein there are no bombs and the airplane can perform extremely long range reconnaissance missions.

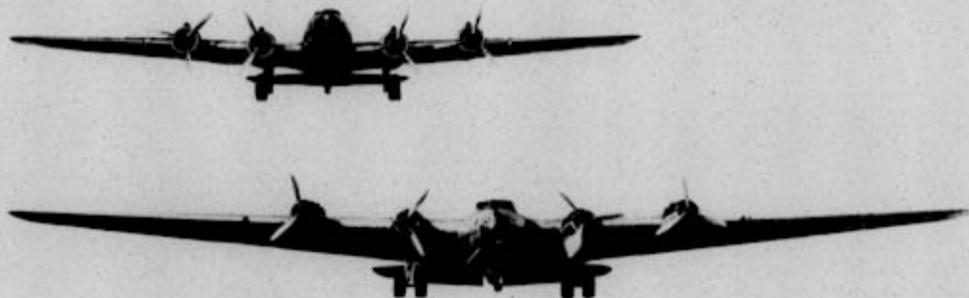
SLIDE 9 - B-17 ALONGSIDE B-15:

This slide shows the difference in size between the B-17 and the B-15. The B-15 is a stage of bombardment development. Though it has range, bomb capacity and other desirable features, such as auxiliary power plant, accessibility of motors in flight, accommodations for crew, and improved defensive fire, it has not yet been developed sufficiently for procurement in quantity.

SLIDE 10 - THE B-17 BORDER:

In this slide, note the strong defensive capabilities of the B-17. A gun position is provided to cover all angles of approach by hostile

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COMPARATIVE SIZE OF AIR CORPS XB-15 AND B-17 BOMBARDMENT AIRPLANES
B-17 in Upper View

FOR PUBLIC USE

PHOTO BY

C. M.



100-114-111



C O N F I D E N T I A L

planes; forward and rear, above and below, right and left. Its size permits sufficient elbow room to work in comfort, which adds greatly to the efficiency of the crew. The B-17 has a top speed of 256.3 miles per hour, at 14,000 feet. The B-10, 214 miles per hour, at 10,000 feet. As has been before stated, speed and altitude performance are the best security and protection. The B-17 type can be procured today with a performance of approximately 300 miles per hour.

The following seven slides have to do with bombing activities of the GHQ Air Force:

SLIDE 11 - AREA BOMBING:

This slide shows the fire power of a B-10 squadron. 200 one hundred pound bombs were dropped by nine airplanes, in one pass over the target area. Note that bombs were being released in train from each airplane, in order to give proper dispersion over the target area.

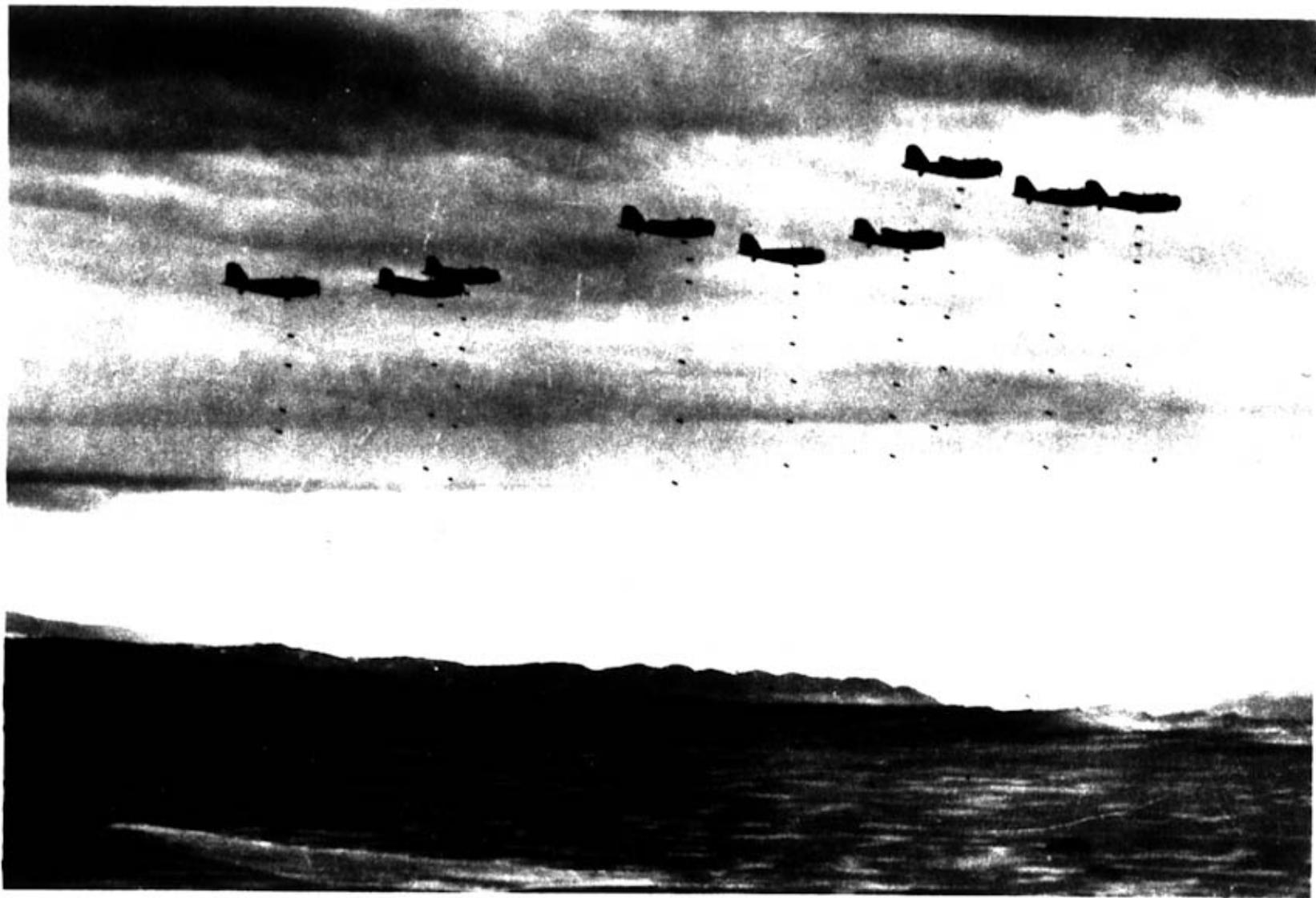
SLIDE 12 - AREA BOMBING - BUNDLE:

This is an actual photograph of area bombing by 9 B-10's.

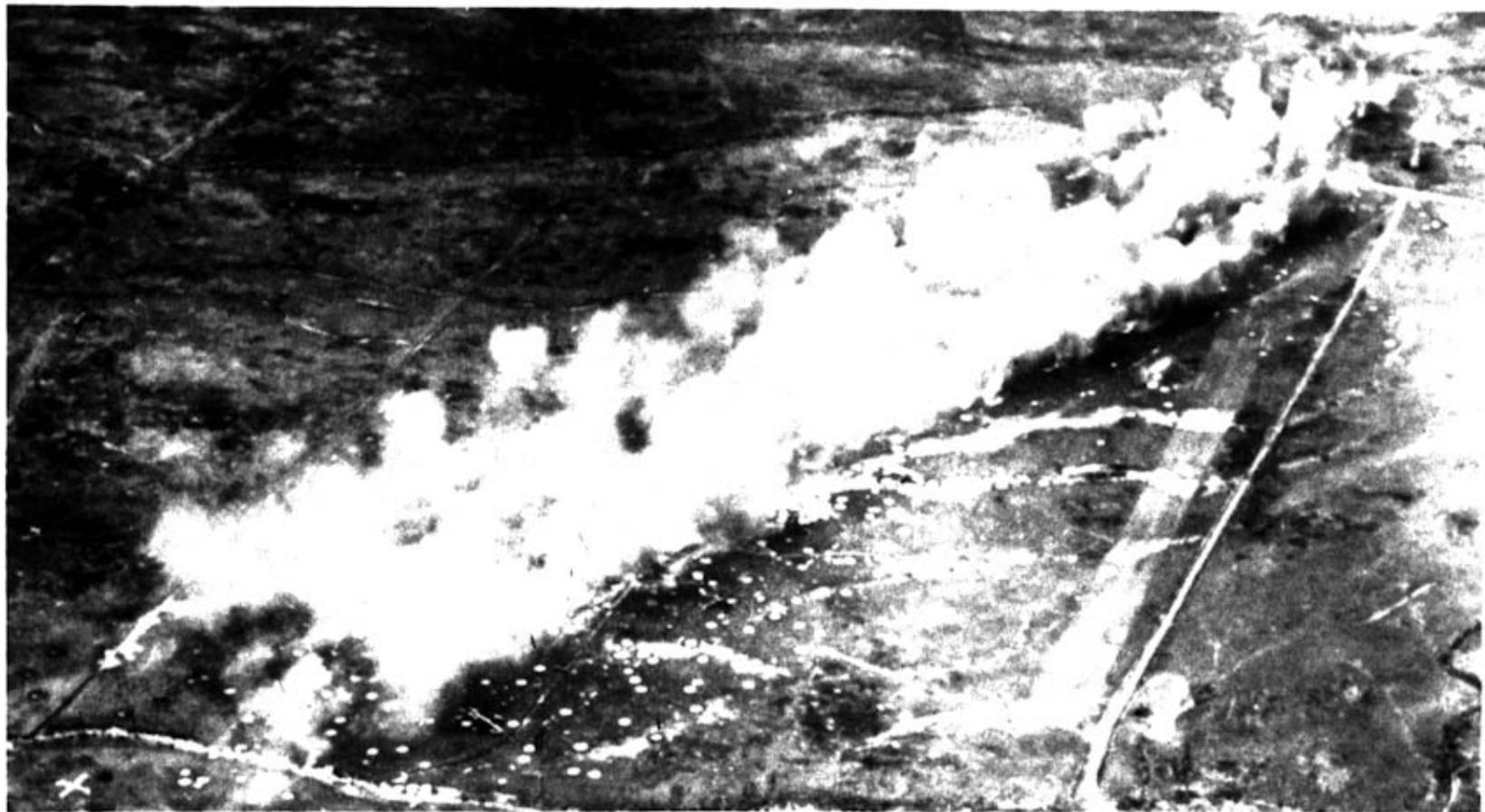
SLIDE 13 - AREA BOMBING PATTERN:

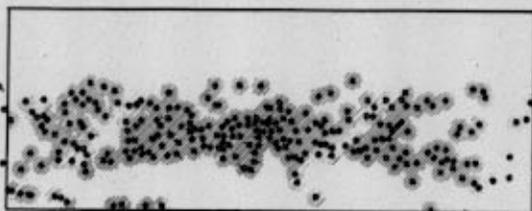
This slide shows an actual bombing pattern obtained from a single run of 9 B-10's. This pattern could well stand larger dispersion.

SLIDE 14 - AREA BOMBING - MULBERRY (BEFORE):









PATTERN OBTAINED BY 19th BOMB. GROUP IN AREA BOMBING AT MIRCOC
 Shaded portion shows effective blast area
 Dimensions of target 200 x 2400 ft.
 Number of bombs dropped 200
 Number of impact points located 200
 Direction of Attack of Squadron →
 Number of airplanes in squadron 3 B-16
 Number of bombs per airplane 32
 Altitude 12,000 ft.
 Type of bomb, Mk VII practice

1st Wing, 9th Air Force, A-4 Waron Field, Calif. JUNE 23, 1950.

C O N F I D E N T I A L

This is a photograph of a target range on which eight old Keystone bombers were dispersed, as they would be on a wartime airdrome. Some were concealed by camouflage. (Point)

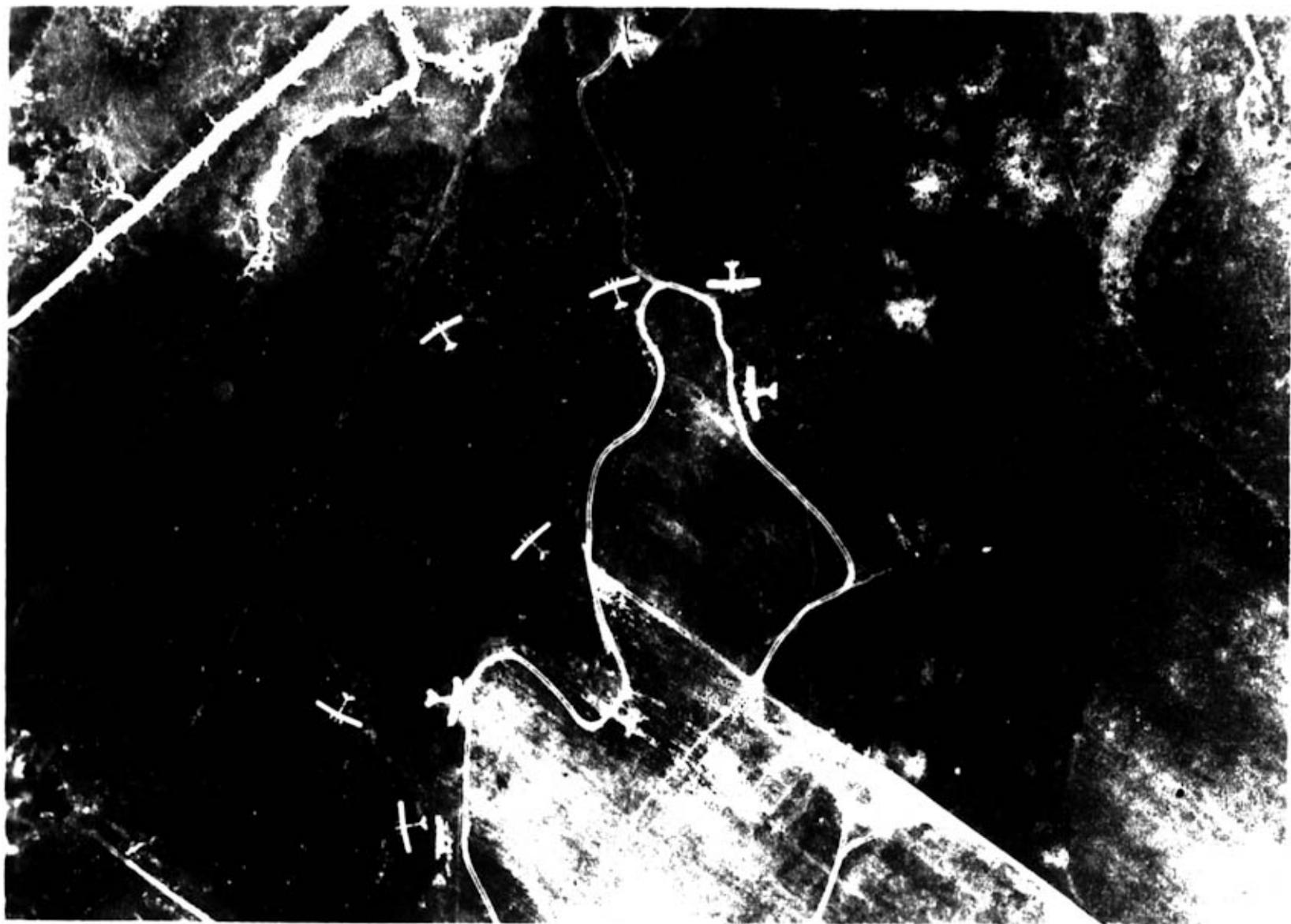
SLIDE 15 - AREA BOMBING - MULBERRY (AFTER):

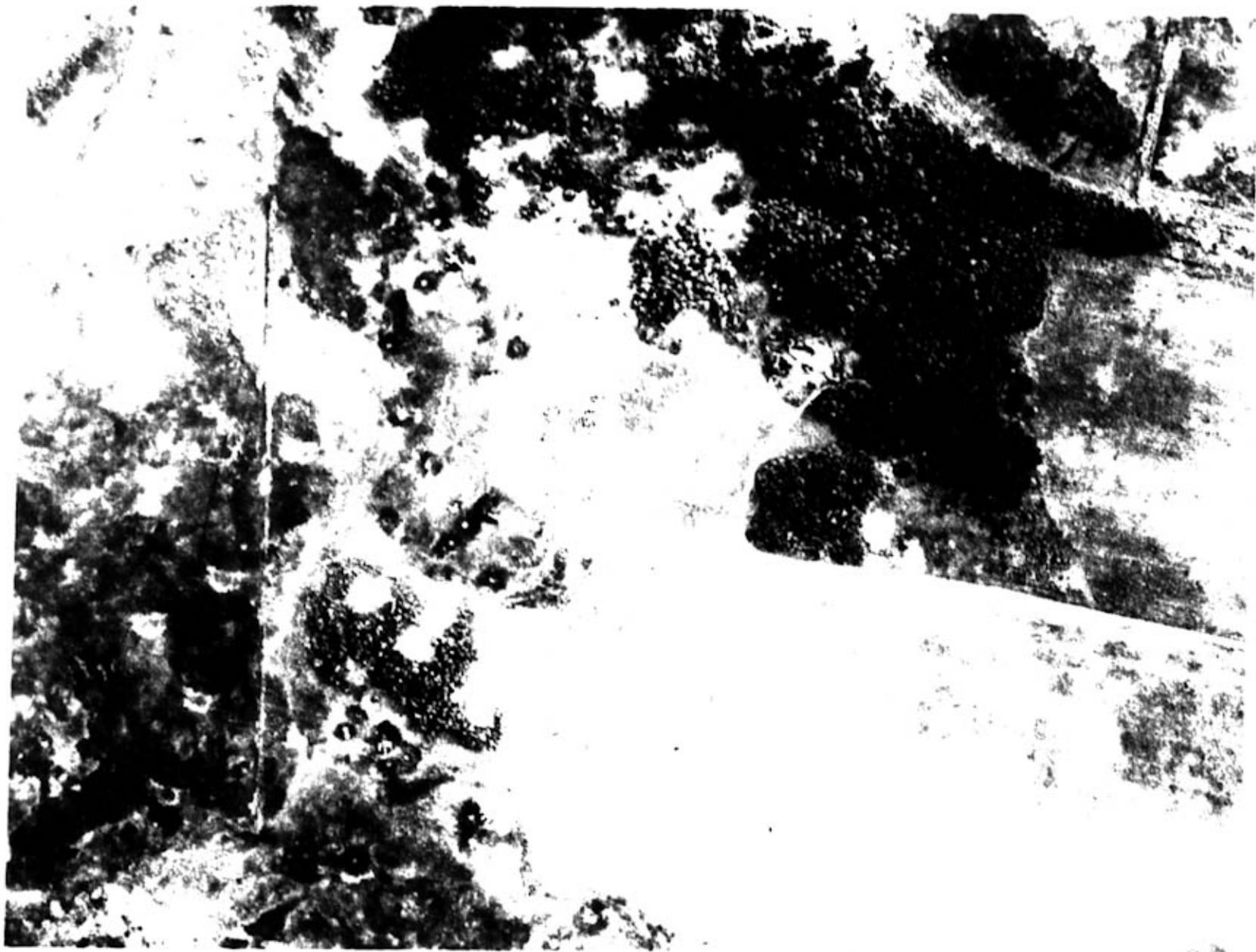
This slide shows the same area after one bombing attack by four B-17's. Every B-6 airplane was destroyed.

It may be of interest to know that about 10 days before the B-17 attack, 27 attack planes bombed this area. At that time there were 11 targets in the area. The attack planes destroyed one of them. In fairness to the attack, however, I again call your attention to the fact that the attack plane is not equipped with a bomb sight. The four B-17's were crewed by 36 men, the attack by 54. The B-17's dropped 66 one hundred pound bombs, and 14 three hundred pound bombs - a total of 74 bombs; the attack employed a total of 100 one hundred pound bombs. I give this as an illustration of the ability of the B-17 to accomplish a close support mission, as well as a strategic mission. A bivouac area, an ammunition dump, a railroad yard, etc., could have been attacked by the B-17's with great effectiveness, employing the same scheme of maneuver used on this airdrome. It illustrates the flexibility of the larger bomber.

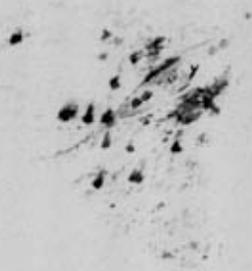
SLIDE 16 - PRECISION BOMBING - UTAH:

This slide shows a salvo which straddled the Utah, the Navy's radio-





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controlled target battleship, in an exercise last year. The Utah was traveling at top speed and was maneuvering continuously. Bombs were dropped from 12,000 feet or above, and the official report of the Navy states that about 11% effective hits were scored.

SLIDE 17 - PRECISION BOMBING - UTMH:

This slide shows a straddle timed for a fast turn of the Utah.

Our bomb sight is a precise instrument, and a properly trained bombing team is capable of very effective accuracy. A recent development in bombing technique, which offers great promise for increased accuracy, is one whereby the bomber, by remote control of the automatic pilot, directs the course of the airplane toward the target; thus eliminating the time lag which attends the system of indicating necessary corrections to a human pilot.

This and other new developments in bomb sights indicate that the duration of stabilized flight, necessary to obtain bomb sight data for the release of the bomb, can be materially shortened, which will appreciably cut down the critical time of exposure to antiaircraft fire in the vicinity of the target. It is expected that this time can be reduced to 20 seconds or less, which at 20,000 feet is approximately the time of flight of a 3 inch antiaircraft projectile.

The outstanding feature in connection with tactical training, since the inception of the GH Air Force, is the success which has attended



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the development of the combat crew as a flying team. The idea is not new -- we have always used gun crews in artillery, and ship crews on naval vessels; but not until the training of tactical air units was centralized under one command, was the idea extended to airplane crews. The system is now well established and, today, the measure of efficiency of a flying unit is not the proficiency of the individual pilots, bombers, and gunners; but instead, the proficiency of the individual combat teams.

Every effort is made to preserve the integrity of the combat team as a flying unit. In training flights we endeavor to have all regular members, or qualified substitutes, at their respective stations.

To my mind, one of the most impressive things about modern military flying is the quiet discipline which characterizes the teamwork of a combat crew; where each man goes about his assigned task with perfect understanding and efficient coordination; with no questions, no confusion, and no wasted effort.

It is this type of efficiency which has made possible the accomplishment of numerous outstanding flights during the past year. Among these should be mentioned the flight last February of six four-engined bombers, from Miami to Buenos Aires in 34 hours elapsed time; and the recent mission of three similar bombers to Bogota, Colombia, in 8½ hours. These two long-range flights, through extremes of weather hazards and under peculiar navigational difficulties, were in effect

~~C O N F I D E N T I A L~~

individual flights; because for safety reasons, airplanes flew without visual contact with each other on all legs of the flights. This placed the combat crew of each airplane on its own. The precision with which each flight was accomplished was a tribute to the uniformity of training methods.

As another instance of efficient training: during the GH. Air Force maneuvers last May, three four-engined bombers were assigned the mission of intercepting the New York bound Italian liner Rex, then about 800 miles at sea. To navigate to a stationary buoy at such a distance would have presented in itself a severe test of navigational skill. Notwithstanding prevailing weather conditions of rain, hail, and low visibility, the bombers were successful in intercepting their moving target approximately 700 miles from their starting point. The Rex was dead ahead when sighted. Ordinarily, such a mission would have been performed on a wide area patrol, and the success of the mission would have depended mainly upon the number of planes in the area. Interception of a known moving target, by three planes in formation, demanded precision of the highest order.

In ground training, of great concern is the provision of competent mechanics and other technicians. The modern airplane is a complicated piece of mechanism, and requires highly skilled mechanics to maintain it. In spite of considerable training of men, both at army schools and at aircraft factories, we have been falling behind in skilled trade

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specialists. Many of our valuable men have purchased their discharge and gone to commercial aviation, or to better paid governmental positions. While the situation has been somewhat eased by the enlarged facilities of the Air Corps Technical School, the ultimate solution lies in increasing the pay and privileges of our enlisted men to the point where service in the Army Air Corps offers at least equal inducements to those of competing agencies.

The role of the GHq Air Force in national defense, and the definition of its mission by the War Department, are prescribed in detail in Training Regulations 440-15. A succinct statement of its place in national defense is contained in an Act of Congress approved by the President, August 12, 1935, usually referred to as the Wilcox Bill. This bill provides and I quote that air bases shall be located so as to develop "The full power of the General Headquarters Air Force for such close and distant operations over land and sea as may be required in the defense of the continental United States and in the defense and reinforcement of our overseas possessions and holdings". A study of the Wilcox Bill and of TR 440-15 leaves no doubt in the mind of the reader as to the intent of the Congress, the President, and the War Department in creating the GHq Air Force. It was to be an M-Day force in every sense of the word: a powerful striking unit, highly mobile; organized, equipped, and trained to go into action on short notice; capable of long range operations of an independent nature over land or sea, as well as operations in close support of ground or naval action.

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Training Regulations 440-15 emphasize the strategic nature of the GH, Air Force, and clearly state the doctrines which shall govern its employment. They point out the fact that the Army is responsible for the direct defense of the coast, and give official recognition to the universally accepted theory that air operations will probably precede the contact of surface forces in a major war. It gives the GH, Air Force an important function as a vital element of our covering forces. Flanked as we are by two oceans, it is very probable that such initial employment of the GH, Air Force will consist of independent operations in defense of the coastal frontiers or reinforcement, to some extent, of Hawaii, Alaska, or Guam.

Airplanes can defend our frontiers most effectively by attacking the enemy. This should occur as far from our shores as we can reach him. This forces to attention the predominant role of bombardment aviation in the defensive problem confronting the GH, Air Force. I do not minimize the importance and value of reconnaissance, pursuit, and attack aviation. They all have their roles, and important ones, in the application of Air Power; but bombardment aviation is, and will always be, the principal striking force employed in air operations. Air Power is measured in terms of bombardment aviation. Other aviation is important but from a different standpoint.

To understand Air Power, it must be realized that the airplane is not just another weapon. It is a comparatively new engine of war which has brought into being a new and different mode of warfare, the appli-

~~CONFIDENTIAL~~

action of Air Power. It is another means, operating in another element, for the same basic purpose as the application of Military Power or Sea Power: - the destruction of the enemy's will to fight.

The threat of the application of Air Power may prevent wars. In 1935 the threat of its application forced the withdrawal of the British fleet from the Mediterranean in the face of Italy's superior Air Power, a withdrawal which was synonymous with surrender of British control in the Mediterranean. This surrender was not viewed lightly by England nor by the world. It resulted in the immediate initiation of a rearmament program unparalleled in peace time history. The threat of the direct application of Air Power to the civilian population and to political centers has caused all the great powers of Europe to indulge in enormous expenditures for air preparedness.

The fundamental difference between air warfare and land warfare lies in the fact that Air Power can be applied directly against a selected objective without first having to overcome barriers and obstacles such as swamps, rivers, mountains, and enemy surface forces.

SLIDE 10 - STRATEGIC AREAS:

Coming back to a more immediate analysis of our missions and of frontier coastal defense, this slide shows areas which can be covered by airplanes having an operating radius of 1,000 miles. Note the important Northeastern Theater which can be covered from an air base in New England, Bermuda from Langley Field, the Caribbean from Miami, the Mexican Coast from San Antonio and March Field, the Pacific Northwest from a new air base now being established at Tacoma.



C O N F I D E N T I A L

As we noted, the Army is responsible for operations in direct defense of the coast. This has several aspects from an air force viewpoint. It includes operations to repulse hostile overseas expeditions. It includes protection of our cities and harbors from the devastating effects of aerial bombardment, the possibilities of which have only slightly been explored in Spain and China, and it includes operations in support of our Navy. In order to perform these functions, the GH. Air Force must have properly located bases, and must at least have equipment with sufficient range to attack any forces an enemy may bring into the areas just shown or any bases, land or floating, which he may establish in these areas.

One of the outstanding reasons for the existence of the GH. Air Force is its ability to strike a hostile overseas expedition in the initial stages, either in cooperation with naval forces or independent thereof, should our Navy be occupied elsewhere. A landing on a hostile shore has always been a hazardous undertaking and with the advent of air power its difficulties are tremendously increased. Troop ships, supply ships, and early concentrations on shore are extremely vulnerable to air attack. Airplane carriers which venture within range of shore based aviation are taking long chances. Certainly we should not lack the means to conduct effective operations against objectives of this type.

The importance of being able to cover the strategic areas shown

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has brought about the development of the B-17 four-engined airplane. No airplane of two or three engines has yet been built which will give the performance characteristics required by our problem of air defense. Compared with existing two-engined airplanes, the four-engined airplane has higher speed, higher ceiling, greater endurance, and greater bomb load. It has far less probability of forced landing, due to engine failure; and its size permits defensive gun positions covering all angles of fire. The 52 planes of this type with which the GHQ Air Force will be equipped will be a big asset to this country's air defense. I believe numbers of planes of these characteristics should be increased, and that they should have greater range and greater bomb capacity.

The task of air defense includes finding the enemy as well as destroying him; so, like any other force, bombardment aviation must have information of and contact with, the enemy. This is the function of Reconnaissance. To support naval district commanders in reconnoitering the vast areas of ocean in which an enemy may be located, and to maintain surveillance over him for our own battle reconnaissance, requires an airplane with great air endurance. In the modern large airplane with bomb and fuel loads interchangeable to a high degree, we have a means of performing the functions of reconnaissance and bombardment with the same airplane; although not usually at the same time. This fact leads to economy in first cost, due to the purchase of larger numbers of the same model; and in maintenance and supply, due to there

C O N F I D E N T I A L

being but one type instead of two. In operations it permits flexibility of employment, as some situations, or some phases of the same situation, require large numbers of reconnaissance airplanes with relatively few bombers; and others the converse.

Bomb and fuel load interchangeability also makes of the large airplane a most powerful weapon for the close support of ground troops. A squadron of twelve B-17 airplanes is capable of dropping a load of 100,000 pounds of demolition bombs over 300 miles behind the front lines. Few people realize that it would require 200 attack bombers similar to our A-17's or two-engined A-19's to accomplish this same mission. Not many people realize the impotence of an air force, equipped only with light attack bombers, to operate against hostile landings or the establishment of bases in the strategic areas shown on the last slide.

The ability to reinforce or withdraw by air from isolated positions like Hawaii or Alaska, for example, is a valuable asset in flexibility of air operations. Otherwise such positions must be kept at adequate air strength or dependence must be placed on shipping and time, both at great premium in war.

With respect to Joint Army and Navy action, the employment of the GHQ Air Force is a matter of common sense and practical application of the principles of Joint Action. The medium of the airplane is the air, and its personnel must be trained to operate against any targets, whether on land or water. Bombardment aviation will always be an

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effective weapon against anything afloat, and Army Air Corps training is designed to increase that effectiveness. Both Army and Navy aviation must be trained to work together.

In this connection, gentlemen, I would like to quote to you a portion of the speech which General Oscar Westover would have delivered to you had he lived.

"In the United States, we do not have a unified Air Force and it is, therefore, of prime importance that our Army and Navy air elements be trained in closest cooperation and conjunction. Without question, it will be placed under single command during the air phase of any major attack launched at our shores and each must accordingly be familiar with the operating systems and practices of the other and be so trained that they will work in complete harmony. If this is not done, by popular demand and insistence, we shall be forced into a permanent unity of air command. I hope that the Army and Navy may be allowed to keep and develop their respective air components, but since all the major nations of the world have unified Air Forces to launch against us, it cannot be expected that the Army and Navy air components will be permitted to operate alone each unaided by the other. If they cannot be trained and taught to operate in harmony, there is not the

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C O N F I D E N T I A L

slightest question but that eventually they will be placed under a separate and unified command. It behooves us who believe the present organization sound and effective to urge closer coordination of training and fuller cooperation in peace-time to the end that there may be no loss of efficiency in the combined and joint operations inevitable in war."

It is hardly necessary to discuss here GH, Air Force functions in direct support of ground forces. They are covered in all our schools and in Training Regulations 440-15. The GH, Air Force is prepared to furnish that support to the extent of its available strength.

Some interesting and instructive points in connection with air strategy and air tactics have come to us from the wars in Spain and China.

Bombardment aviation has proven, time and again, that it can get through to its objective regardless of interference by pursuit and anti-aircraft artillery. Speed has been its greatest factor of safety; altitude has been next in importance. Defensive fire power, important when needed, nevertheless ranks third among these considerations. Attacking pursuit will always be quick to take advantage of any blind angles or dead spaces in the defensive fire of bombers.

In both wars, pursuit aviation has reestablished itself as the most effective weapon against aircraft in flight. Antiaircraft artillery

C O N F I D E N T I A L

of most modern design has been relatively ineffective at high altitudes. However, the increased effectiveness of small arms fire and of the new small caliber antiaircraft cannon has greatly increased the danger to low flying aviation. It is evident that troops can be trained to fire at attacking airplanes and that such fire is effective at short ranges. On the other hand, troops in the open and on roads where cover is lacking may become demoralized when attacked by bombs and machine guns.

It has apparently become standard practice in Spain to employ every available airplane, -- bombardment, observation, and pursuit alike, -- in the support of ground battles, by operating in masses against front line positions. This practice of employing aviation as artillery has introduced tactics in land warfare which unquestionably have increased the power of the attack. Yet the practice is, I believe, basically unsound in that the same number of bombs delivered against proper objectives, always present behind the battle line, will have a more lasting effect on the war as a whole. It is possible to win all the battles and yet lose the war. The tenacity with which the Loyalist forces in Spain have held on, despite the loss of battle after battle and province after province, dismemberment of their territory and division of their forces, -- all of this, in my opinion, is proof of the unsoundness of the employment of Spanish Insurgent aviation. It emphasizes the soundness of our doctrine that air force operations in close support of ground forces should be aimed at objectives behind the battle area, such as vital logistical establishments, essential lines of com-

CONFIDENTIAL

munication, and concentrated bodies of troops.

To us in the military service, the influence of the airplane in future warfare is more than just an interesting topic for discussion. It is a matter of vital concern. We must profit all we can from the experience being gained daily by other nations throughout the world. The development of Air Power is going forward at a fast pace, -- a pace being set by four major European powers in a race to attain what each deems to be adequate air effectiveness.

All eyes have been on Spain and China, watchful for some decisive success or failure of aviation to prove opposing views. The truth of the matter is that air power, as visualized by its proponents, has not been present, either in Spain or in China. Air Power involving thousands of bombers is coming into being; and, at the pace rearmament is proceeding in Europe, Air Power of the magnitude visualized by Douhet is just around the corner. Reliable information indicates that Germany is now producing around a thousand modern military airplanes a month. Great Britain, during the present financial year alone, has made available over six hundred million dollars for her air force.

SLIDE 19 - EUROPEAN AIR POWER:

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EUROPEAN AIR POWER

	<u>Germany</u>	<u>Italy</u>	<u>England</u>	<u>France</u>
Bombardment, First Line	3650	1630	1202	932
Bombardment, Other	100	36	2149	129
Pursuit, First Line	1400	830	82	454
Pursuit, Other	300	47	1102	310
Miscellaneous, First Line	2950	530	1214	356
Miscellaneous, Other	<u>1500</u>	<u>1002</u>	<u>1271</u>	<u>508</u>
Total, First Line	8000	2990	2578	1742
Total, Other	<u>1900</u>	<u>1085</u>	<u>4602</u>	<u>947</u>
GRAND TOTAL	9900	4075	7180	2689

This slide shows the status of European air power today. Many additional planes are on order. Germany and Italy, as you see, have about two and one-half times as many first line bombers as France and England. This, I believe, is largely responsible for the marked diplomatic victory Germany has just won, notwithstanding a great British navy and a great French army.

In analyzing types in European air forces it is apparent that the type specifications fit the particular military problem of each nation. I believe that our military problem of national defense requires our bombardment strength to be predominantly of the large capacity long range type.

The significant lesson, to be drawn from this rearmament race, is

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that a modern air force cannot be created and manned overnight. When we consider that Germany, a totalitarian state of high industrial potentialities, has taken three years to build and train an air force, and when we further consider the disappointments and failures of non-totalitarian countries who also have been bending every effort to create effective air forces, the fact is forcibly brought home to us that an air force cannot rapidly be expanded to meet an emergency. Its creation, like that of a Navy, requires far more time than is available after hostilities begin.

It is the belief of many that future wars will begin with air action. A formal declaration of war no longer gives warning of the first blow. An air force, therefore, should be fully equipped and trained in peacetime, ready for action on M-Day. Such is the objective of the GH. Air Force.

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messenger stated
that Mr Johnson
wished this letter
to go to Mr Mc-
Intyre.

PS F: 2.1.38

WHITE HOUSE
OCT 22 2 21 PM '38
RECEIVED

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

October 12, 1938.

MEMORANDUM FOR THE PRESIDENT.

1. In my memorandum to you dated August 12, 1938, I recommended approval of a number of items to be included in the educational orders program for the current year. You approved the items mentioned and made available the necessary funds for the entire year's program.

I also stated in my memorandum that the Board of Officers had suggested an airplane item as a part of the program but that I had withheld approval pending further study. The Board of Officers has now reported and recommended the inclusion of training airplanes in the current year's program and this recommendation I have approved for the following reasons:

a. These types of planes will be required in large quantities for training purposes at the earliest possible date, to prepare crews for the combat planes.

b. The training planes in question are now largely standardized as a required type.

c. The utilization of the training plane as a subject for an educational order offers an immediate opportunity to open badly-needed new sources of supply for this item.

2. It is recommended that you approve training airplanes for inclusion in the current year's educational orders program. No additional funds other than those already available will be required to carry out this recommendation.

Louis Johnson

LOUIS JOHNSON,
The Assistant Secretary of War.

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

DUPLICATE COPY

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(Signed) LOUIS JOHNSON

LOUIS JOHNSON,
The Assistant Secretary of War.



THE ASSISTANT SECRETARY OF WAR
WASHINGTON

October 16, 1933.

MEMORANDUM FOR MR. FORSTER,
THE WHITE HOUSE.

Dear Mr. Forster:

Here is an exact copy of the
memorandum sent over on October 12th.

Louis Johnson

Enclosure.

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

DUPLICATE COPY

October 12, 1938.

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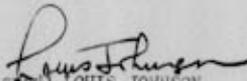
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(Signed) LOUIS JOHNSON

LOUIS JOHNSON,
The Assistant Secretary of War.

P. F. Johnston

WAR DEPARTMENT
WASHINGTON

November 1, 1938.

MEMORANDUM FOR THE PRESIDENT:

A careful consideration of the possibilities of educational orders in national defense, Mr. President, convinces me that any sound program must give adequate recognition to their importance. For this reason I recommend that \$32,500,000 for educational orders be included as an essential element in the program now being formulated.

I wish to emphasize, Mr. President, that the proposed program of educational orders is in addition to the contemplated augmentation of current procurement in aircraft and other items. This augmentation of reserves is designed to provide for essential requirements only until new production after M-Day is adequate to meet the situation. The funds requested for educational orders will materially advance the date when new production will become adequate. Within limits, therefore, the educational order provides a very economical and effective method of supplementing reserves, the cost of a full supply of which, under the Protective Mobilization Plan, would be prohibitive.

Of the many thousands of items required by the Army, we have selected 55 of the highest priority which are so difficult of production as to require an educational order to prepare industry for their manufacture in war. A total of about 250 separate plants will require education as primary producers of these items. Under this program, if approved, we are confident that essential industry can be prepared to obtain quantity production of all major items of equipment within a six months' period after M-Day.

It is for these reasons that I recommend that \$32,500,000 for educational orders be included in the National Defense Program under consideration. In this total, allowance has been made for the expenditure of \$2,000,000 under the current year's appropriations.

Louis Johnson
Acting Secretary of War.

PSF *[Handwritten signature]*

WAR DEPARTMENT

I M M E D I A T E

R E L E A S E

EDUCATIONAL ORDERS

The Assistant Secretary of War, the Honorable Louis Johnson, announced today that the President has just approved the inclusion of primary and basic training airplanes in the educational orders program of the War Department for the current year. These are the last items on the program for fiscal year 1939. Based on legislation passed by the last Congress, the original program for educational orders was prepared by a board of army officers appointed for the purpose, and after approval by the President, financed with \$2,000,000 from current appropriations.

The items now in the program for this fiscal year include:

- Semi-automatic infantry rifle
- Recoil mechanism for 3" anti-aircraft gun
- Forging of 75 mm shell
- Machining of 75 mm shell
- Gas Mask
- Anti-aircraft Searchlight
- Primary Training Airplane
- Basic Training Airplane

Secretary Johnson explained that these items include those of highest priority from a five year program submitted by the Board of officers. From the beginning airplane material was considered as among the items of highest priority, but that standardization of type had not been attained which was necessary to make the results of an educational order of permanent value. This standardization has now been accomplished and Secretary Johnson and General Arnold, Chief of Army Air Corps, are confident the training type planes now included in the program will remain standard for five years, at least.

The policy of the government in executing the educational orders program, according to Secretary Johnson, is one of complete cooperation with industry so that selected manufacturers in peace can familiarize themselves with some of the more difficult problems of munitions manufacture in war, and to enable them to initiate their war schedules of production with a minimum loss of time.

The selection of the items for inclusion in the educational orders program was restricted to essential articles, now standard for procurement and likely to remain standard for a considerable period of time. The items were also to be non-commercial in character and required in such large quantities, or so complicated in structure, that education of industry in their production is necessary.

Among the important results sought is to obtain in peace-time dies, gages, fixtures and other aids to manufacture, the lack of which would cause delay to a munitions program in a war emergency. The present educational orders provide that these aids to manufacture become the property of the Government after the order is completed.

End

PSF: Aviation

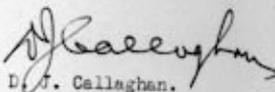
THE WHITE HOUSE
WASHINGTON

November 12, 1938

Memorandum For The President.

In connection with the recent inspection of planes at the Naval Air Station, Anacostia, the Secretary of the Navy asked me to transmit to you the attached memorandum in reference to the aircraft procurement program of the Navy as at present constituted.

Respectfully,


D. J. Callaghan.

In reply address not the signer of
this letter but Bureau of Aeronautics,
Navy Department, Washington, D.C.

Refer to No.

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NAVY DEPARTMENT
BUREAU OF AERONAUTICS
WASHINGTON

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M E M O R A N D U M

FOR: Secretary of the Navy.

NOV 5 - 1938

SUBJECT: Procurement of Naval Aircraft.

1. The Naval aircraft strength at present constitutes about 1800 planes, which are divided into an essential minimum of five combatant types, namely: (a) Battleship and Cruiser Observation-Scouting, (b) Aircraft Carrier Fighters, (c) Aircraft Carrier Scout-Bombers, (d) Aircraft Carrier Torpedo-Bombers, (e) Flying Boats or Patrol Bombers.
2. Each of these types fills a requirement that can be met in no other way and none of these types can serve the purpose of any of the others. The evolution of these types has resulted from continuous study, development and experience throughout the existence of Naval Aviation. Recommendations from the Fleet and approved recommendations from the General Board have preceded each step. Constant and successful effort has been made to avoid undue diversity of types, for it is apparent that the use of more types than definitely required would be needlessly extravagant and complicated in peacetime and a serious obstacle to rapid expansion of aircraft production in war emergency. Even more serious, however, in its reduction of war effectiveness, would be the elimination, for the sake of simplifying mass production, of any of the Navy's five essential types.
3. Reviewing these standard types, which are the irreducible minimum resulting from the considerations described above: Battleship and Cruiser Observation-Scouting planes must operate on floats so as to be able to return to their ships after catapulting. They must have low landing speed for safety in rough water landings and they must have maximum endurance so as to be able to remain in the air throughout daylight if necessary in order to be on station whenever major action begins. Because of these characteristics, high speed and offensive qualities must be sacrificed.
4. Aircraft Carrier airplanes, on the other hand, must be designed for maximum speed, range and offensive qualities and the fact that they operate from aircraft carrier decks on wheels makes it possible for these characteristics to be stressed. Of the three aircraft carrier types, the Fighting plane is primarily for offensive action

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M E M O R A N D U M

SUBJECT: Procurement of Naval Aircraft.

against other aircraft and could not serve this purpose unless it were specially designed around nothing but the primary requisites of speed and gun power. The Scout-Bomber meets the dual requirements of long range scouting at high speed and ability to deliver heavy dive bombing attacks against surface vessels. The Fighting plane can do neither of these things, nor can the Scout-Bomber, being built for greater range, special navigational and radio communication arrangements and heavy dive bombing, accomplish the Fighter's mission. The Torpedo-Bomber is, as its name implies, a heavy duty plane combining long range with ability to carry either heavy bomb loads or a heavy torpedo. Neither of the other carrier types can meet these requirements and the Torpedo-Bomber cannot, speed having been sacrificed for range and load, accomplish the mission of either of the other two.

5. The fifth type, the Flying Boat or Patrol Bomber, meets the requirement of extreme long range and extreme weight-carrying capacity combined with ability to operate from the water in a comparatively independent status with the assistance of shore or aircraft tender facilities. It cannot, because of its size and weight, be operated from ships like the other types but it can and does accompany the Fleet, while on the other hand none of the other types can in any way match the qualities which are essential in this large flying boat plane.

6. Each of the first four types remains in service for five years, and the fifth type eight years. These periods are an arbitrary compromise dictated by economy and obsolescence. There are thus placed in service about 350 new airplanes annually. These replacements keep each type reasonably abreast of improvements in the art and result in one-fifth of our planes being of the latest type, while, on the other hand, one-fifth are five years old, the remainder lying between these two extremes.

7. Experimental planes on which the yearly average production of 350 planes is based, are obtained as follows: (a) Design competition is held, based on Navy prescribed general characteristics, open to all competent aircraft manufacturers. (b) Design evaluation of the foregoing by the Navy on engineering merit. (c) Contracts for experimental planes based on designs standing one and two (for number three also if funds are available) are made, and these planes are flight tested competitively when delivered. (d) The plane standing one in the flight test is used as the model for the next quantity procurement of that type. It usually requires about two years from date of issue of design competition to completion of flight tests of experimental planes, and for this reason each design competition is started two years before planes in service are due for replacement.

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MEMORANDUM

SUBJECT: Procurement of Naval Aircraft.

8. The results of the foregoing system are that one of the latest models of each of our five types is always in production which in an emergency can be expanded as necessary within the limits of the capacity of our aircraft industry by simply reproducing the latest types already in service.

9. Quantity production is currently limited only by funds appropriated for the purpose. Experimental manufacture is the minimum necessary to apply improvements in the art, which are still very marked from year to year, to airplanes replacing those which have completed their periods of combatant usefulness. The entire arrangement differs from best foreign practice only in quantities produced and in the methods of procurement which, in our case, are rigidly prescribed by law.

ABC

A. B. COOK

Rear Admiral U.S.N.
Chief of the Bureau of Aeronautics

Date- 4-22-66

Signature *Carl S. Spicer*

PSF: Aviation

THE ASSISTANT SECRETARY OF THE NAVY
WASHINGTON

CONFIDENTIAL

Aviation file
NOV 25 1938

My dear Mr. President:

I enclose herewith a memorandum showing in condensed form the Navy's naval aviation requirements, for your consideration in connection with your current plans for strengthening our aviation arms. The memorandum and the plans and studies on which it is based have the approval of Admiral Leahy.

I cannot stress too strongly my recommendation that the Navy's aviation requirements receive favorable consideration at this time. The aircraft are the minimum number needed for the Navy as authorized in the Naval Expansion Act, and the shore facilities must be available for the aircraft to function satisfactorily in carrying out their missions with the Fleet. The shore facility requirements are confirmed by the extensive studies of the Statutory Board headed by Rear Admiral Hepburn, required for Congress by the terms of the Naval Expansion Act. The cost is at present only a rough estimate and may exceed the figure of \$120,000,000 used in the memorandum. The report of the Hepburn board is now being completed.

Early approval of the attached memorandum will be greatly appreciated, since the Navy Department can then develop detailed plans and studies on a definite basis.

Sincerely yours,

Charles G. ...

The President,
The White House.

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DOD DIR. 5200.9 (9/27/58)

Date- 2-18-59

Signature-

Carl F. Spicer

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON.

NOV 25 1938

MEMORANDUM for THE PRESIDENT

SUBJECT: Naval aircraft requirements.

I - Requirements

(a) The total peacetime Naval plane requirements, including the Naval Aviation Reserve, are 3,381, divided as follows:

Regular Navy and Marine Corps	3,000
Naval Aviation Reserve	381

(b) Planes are on hand or funds (including the 1940 Bureau of Aeronautics Budget Estimates) available for procurement as follows:

Regular Navy and Marine Corps - 1,997	Shortage - 1,003
Naval Aviation Reserve - 212	Shortage - 169
Total Shortage	1,172

II - Procurement

(a) It is proposed to make up this shortage of 1,172 planes over a period of five years, which will involve an annual additional procurement of about 230 planes per year. The average yearly procurement for the replacement of the obsolete planes for the regular Navy, Marine Corps and Reserve is now about 350 planes per year. Hence, if the above increase is made, the average annual procurement of planes for the next five years will be about 580 per year, which will cover all Naval peacetime requirements but will not provide for any wartime reserve.

(b) On the basis of the foregoing the Navy will require 1,187 planes during the next two years (the fiscal years 1940 and 1941), which is the series now tentatively set for the expansion of Army aviation to 12,000 planes. The cost of the 1,187 Naval planes will be \$124,500,000. In addition to the sum of \$38,549,524 already carried in the 1940 Bureau of Aeronautics Estimates for new aircraft, the additional amount required for the next two years is \$86,000,000. This is the amount which should be specifically provided for Naval aircraft expansion in the budget for the Army's two year expansion program.

III - Shore Facilities

(c) The Navy is already seriously lacking in shore facilities for Naval aviation. These present deficiencies in shore facilities, together with additional requirements resulting from Naval aviation expansion contemplated in the Naval Expansion Act of 1938, make it essential that provision be made to expand Naval aviation shore facilities. The total cost of these shore facilities is estimated at \$20,000,000. This amount should be specifically provided concurrently with that recommended for procurement of aircraft.

Charles A. ...

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C.

15F

~~Secret~~

Dear Mr. President-

The reply from
Col. Smith, (Military Attache, Berlin) is
interesting in parts - and you may
want to glance through it -

Sincerely -
Lans Johnson

Dec. 8-48.

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DD FORM 1300 (9/27/58)

5200.9 (9/27/58)

Date-9-7-76

Signature- JLD

G-2/2082-929

WAR DEPARTMENT
WAR DEPARTMENT GENERAL STAFF
MILITARY INTELLIGENCE DIVISION, G-2
WASHINGTON, D. C.

G-2
J M

DEC 5 1938
ATTACHÉ MILITARY
MIL. INTL. DIV.
2082-929
L. MONT

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DECLASSIFIED

DOD Form 1000.9 (9/27/58)

October 7, 1938.

Date-

Signature-

Subject: German Aviation.

To: Military Attache, Berlin, Germany.

1. The Division has had a request from an important official for certain information with respect to the acknowledged predominance of Germany in military aviation. The Division, as well as this official, is familiar with the general reasons for Germany's superiority in production based upon her superlative degree of political and economic control of industry, labor, distribution of material, etc. The centralized control of all steps in planning and decentralized operations in production are also well known. These factors need not be enlarged upon. The more important factors regarding which information is desired are:

a. The ability of Germany to develop her pilot and operating personnel with such rapidity and on such a large scale.

b. The possibility that simplification of design permits simplification of operation and consequently rapid training of personnel.

c. The possibility that simplicity, efficiency and ruggedness of design accounts for rapidity of production.

d. Strategic and tactical conceptions as to the employment of its aviation which may materially influence types of planes.

2. It is suspected, in view of Germany's known accomplishments in simplicity and ruggedness of its World War material, that in her present aviation program she has also injected simplicity of design and operation which may partially account for her recent extraordinary expansion in materiel and personnel.

3. It is therefore desired that you report those less known factors enumerated above which may have contributed

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OFFICE OF THE
CHIEF OF STAFF
MIL. INTEL. DIV.
2082-929
-1-
WAR DEPARTMENT

to the existing superiority of German aviation. Many of these factors have been touched upon in your admirable annual aviation report. However, a resume of these specific factors, with your conclusions, is desired at this time.

For the A. C. of S., 3-2;

J. A. Crane
J. A. CRANE,
Colonel, General Staff,
Military Attache Section.

ml

No. D-16,241.

1st Ind
RECEIVED G/W/M DEU 5 1938

D-16,241.

Office Military Attache, American Embassy, Berlin, Germany, Nov. 6, 1938.
To: A.C. of S., G-2, War Department, Washington, D.C.

1. Paragraph 1 of letter of October 7, 1938, German Aviation, will be dealt with under the sub-headings a, b, c etc. as used in basic communication.

a. Personnel

It is the opinion of this office that the important official mentioned in the basic communication has in requesting information on the ability of Germany to develop her pilot and her operating personnel "placed his finger on the sore spot" of German aviation. Sufficient factors are not in the possession of this office to make a definite statement to the effect that Germany is defunct in well trained pilots and operating personnel, but it is felt that even for the squadrons now organized, the personnel are not as a whole thoroughly trained or in fact even more than partly trained. It is felt, however, that it is not a lack of personnel, but rather a lack of thoroughly trained personnel. Time alone can correct this deficiency. Information bearing this out is only of a scattered nature and this office was loathe to report on this matter heretofore.

It is a fact, however, that in the last three years over one hundred thousand men have come into the Air Force from the training battalions, some have been given pilot training, some mechanic training, some training with anti-aircraft units or with signal units

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In addition the training fields for men that were too young to have participated in the World War and were too old to be of primary consideration in the formation of the new Air Force, have been producing many many pilots, observers and gunners. In addition the cadet schools have been turning out approximately 1000 officers each year. The question arises, however, regarding the proficiency of these men. During the recent Czech crisis it is known by this office that schools in the vicinity of Berlin were stripped of their personnel in order to put the Air Force on a readiness basis. It is also known that in two of the most important and well known fighter groups no night training has been given with the Messerschmitt 109 airplane, as it was felt that the personnel of these groups were not yet capable of handling these airplanes in night work.

b. Simplicity of Design.

The designs of front line airplanes in Germany are not simple as far as operation is concerned, with the possible exception of the Messerschmitt fighter. This specific plane is easy to fly and land, but cannot be considered simple in operations. On the other hand, the primary training airplanes are so easy to fly that serious trouble develops in the transition from primary to advanced flying training.

It is felt, however, that the future military airplane of Germany will not be simple in design, but will be simple in operation, if such is found to be within the realms of possibility without too much sacrifice of efficiency. In other words, it will be as automatic in operation as possible, the pilot in battle thinking only of the throttle, the stick and the trigger. The complication will occur in the matter of maintenance, but maintenance takes place on the ground and is carried out under comparatively favorable conditions by thoroughly trained mechanics; not in the air, where all attention must be on someone trying hard to shoot you out of the air. Some indication of this is the great amount of stress that Germany is placing on the training of thousands of airplane mechanics.

c. Rapidity of Production.

In general the designs of American airplanes are equal to German airplanes in simplicity, efficiency and ruggedness of design. The exception is the Messerschmitt whose design accounts for a 15% increase in the rapidity of construction. Some of the real reasons

for rapidity of production in Germany are:

- Centralized control,
- Freedom from labor difficulties,
- Freedom from financial and contractual difficulties,
- Straight line factory production of one model,
- Thousands of worker imbued with a spirit and will to produce for a government which they feel is doing all in its power for them,
- Millions of feet of floor space in well planned, well lighted factories, offering excellent working and unusual recreation facilities,

d. Strategical and Tactical Conceptions,

This office possesses very little information regarding the real strategical and tactical conceptions as to employment of German aviation. Germany thoroughly believes in dive bombing, feeling that European weather precludes the possibility most of the time of bombing from high altitudes with sufficient visibility to insure accuracy.

Germany has no so-called "attack airplanes" but relies on dive bombing for this phase of work, believing that in compact, highly fortified Europe the only space available for attacks is the air. In thickly populated Europe any move of attack airplanes skimming the tree tops would be reported by the ground signal nets.

Germany has no large flying fortresses in production, believing that the first objectives in Europe come within the range of their two engine bombardment airplanes. Germany has prototypes of four engine bombers that can rapidly go into production if the need should develop.

Germany feels that speed is more essential for bomber airplanes than fire power or unnecessary comforts.

Germany believes that the anti-aircraft and the aircraft belong under the same head and in the same organization.

Germany believes that although her Air Force is organized separately from the Army, the work of the Air Force is to help the Army and not to endeavor to win a war alone. For instance, she feels that if the Air Force can stop all lines of communication of the enemy's army, then that enemy army must capitulate.

2. Even at the risk of being thought of as a convert to some foreign ideas, it is herewith stated as a belief that the extraordinary expansion in material and personnel is not due at the present time to any injection of simplicity of design and operation, but due mainly to the driving force and the will and the authority of those men at the head of the German Air Force, coupled with the age old national psychology of the German people to follow a strong leader with fanaticism, and to sacrifice themselves for the furtherance of the national cause. The extraordinary expansion is not due to cleverness or knowledge above that possessed by manufacturers of the United States, but extraordinary results can be expected in the future resulting from a research problem of the past three years that must produce cleverness and knowledge far above that of any nation not paralleling this research program.

Truman Smith
Truman Smith, *AK*
Lt. Colonel, G.S.,
Military Attache.

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DEC 10 1958

DDO 100-9 (9/27/58)

Date- 8-7-70

Signature- *AK*

WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF
WASHINGTON, D. C.

*By PEF: [unclear]
Johnston*

December 16, 1938.

MEMORANDUM FOR SECRETARY JOHNSON:

1. This program seems to be an excellent one and there are no flaws in it so far as I can see in eventually turning out sufficient flying personnel to meet the needs of the Army for piloting.

2. In connection with the proposed program, I suggest caution in anything that may be promised to female enrollees such as are mentioned on page 9, because there is a positive disadvantage even behind the lines for transport work and even ambulance work if women pilots are involved. I had a very bitter experience with the women pilots in the Ninth Corps Area who wished enrollment in the Reserve Corps along the lines indicated. If they were all Amelia Earharts, things would be different.

Johnston
Chief of Staff.

December 17, 1938

MEMORANDUM FOR THE PRESIDENT.

During the past few weeks the Civil Aeronautics Authority has been making studies of schemes for giving vocational flying training to a large number of selected civilians in order not only to promote civilian aviation but also to assist in meeting our national defense needs. The War Department has been pleased to work with the Authority and is very appreciative of the cooperation shown.

As a result of these efforts, the Civil Aeronautics Authority is now proposing a program as definite as present circumstances permit. This program has been reviewed by the Army Air Corps and is endorsed by it as is shown in attached letter.

In my opinion the program is an excellent one and should be of real assistance in the years to come in assisting the Army to meet its needs for pilots.

Inclosure

LOUIS BRIDGES

COPY

December 17, 1938

SUBJECT: Proposed C.A.A. Vocational Training Program in Aviation.

TO: The Assistant Secretary of War.

The proposed program for vocational training in aviation prepared by the C.A.A. has been reviewed in this office. It provides a long range program which should result in the creation of a pool of selected and partially trained flying personnel. It should be of material assistance in building up an air force for national defense and has the approval of this office.

W. G. Kilner,
Brigadier General, Air Corps,
Acting Chief of the Air Corps.

PSF: [unclear]

Answers file

NATIONAL YOUTH ADMINISTRATION
1754 NEW YORK AVENUE NW.
WASHINGTON, D. C.

December 19, 1958

MEMORANDUM FOR THE PRESIDENT

In an attempt to clarify the part of the National Defense Program having to do with personnel, the attached general plan has been worked out by representatives of the Department of Labor, Army, Navy, and the National Youth Administration.

Respectfully submitted

C. V. McLaughlin

Charles V. McLaughlin
Assistant Secretary of Labor

Louis Johnson

Louis Johnson
Assistant Secretary of War

Charles Edison

Charles Edison
Assistant Secretary of the Navy

Aubrey Williams

Aubrey Williams
Executive Director
National Youth Administration

With regard to the expansion of National Defense, the following outline is an attempt to cover the field with reference to the sources of labor supply and labor standards and the interrelations and functions of the government agencies involved. The fields of operation will be four: military services, private industry, government operated plants, and work relief.

I. WORK TO BE PERFORMED

- A. Construction and equipment of plants
- B. Production of raw materials
- C. Manufacture of planes and equipment
- D. Operation and administrative activities
- E. Repair and maintenance of facilities
- F. Strengthening of agriculture (emphasizing live stock and food production)

II. SOURCE OF LABOR SUPPLY The labor supply for immediate expansion of present activities on the part of the Government, Private Industry, or the Military Personnel would be drawn from:

- A. Unemployed journeymen, machinists, helpers, operatives, etc.
- B. Displaced skilled workers now employed in other fields
- C. Persons now employed on the Works Progress Administration or other government relief work
- D. Workers now employed in agriculture
- E. The entrance of persons into private industry or the military services from vocational schools, the National Youth Administration, and the Civilian Conservation Corps

III. INCREASING THE LABOR SUPPLY This work would be carried on through

- A. The National Youth Administration by increasing facilities to give opportunities to a larger number of young people for the development of aptitudes and rudimentary knowledge and for work experience in the skills affected. This to be done through:
 - 1. Expansion of the program for constructing and equipping of local vocational agricultural work shops
 - 2. Expansion of local construction projects designed to give training in hand tools and metal work of all character
 - 3. Expansion of metal work activities in the 500 resident work centers now conducted by the National Youth Administration
 - 4. Development of larger key units, such as Quoddy, Algiers, etc., for a more intensive period of work experience in the trades affected.
- B. The War and Navy Departments which will be responsible for specialized training of personnel necessary for Research and Engineering, Operations, and Maintenance of military equipment and those required for the production of military equipment in Army Arsenals and Navy Yards.
- C. Vocational schools by increasing facilities and supervisory personnel in order to provide a large number of young people with opportunities in the desired skills.
- D. The Civilian Conservation Corps might be used as an adjunct of the military service. The training of 100,000 youths in addition to those now enlisted in the Army could be obtained for operation and maintenance work and for instruction in the sciences of machine warfare.
- E. Intensive short courses of three or four months for the moving up of partially skilled persons now employed in the metal trades to a higher status.

- IV. LABOR STANDARDS The standards of labor would follow conditions of work and wages in accordance with the standards that are written into the law through the Acts of Congress and those reflected in organized labor in the affected fields. The maintenance of such standards and conditions of work would be made the responsibility of the Department of Labor and all matters affected would be under its jurisdiction.
- V. CLASSIFICATION AND JOB PLACEMENT The Department of Labor would also be responsible for the classification and job placement aspects of the work.

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WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF
WASHINGTON, D. C.

WPD 3674-10

Re: iton
December 19, 1938.

MEMORANDUM FOR THE ASSISTANT SECRETARY OF WAR:

Subject: Two-year Army Augmentation
Program.

In compliance with your letter of December 10, 1938,
on the above subject, attached is a self-explanatory Memorandum
in justification of the four-point program submitted to the
President.

Lucian Gray
Chief of Staff.

Enclosure
Memorandum.

Franklin D. Roosevelt Library

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DOD DIR. 5200.9 (9/27/88)

Date- 2-18-59

Signature-

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WAR DEPARTMENT
WASHINGTON

December 10, 1938

My dear General Craig:

During the next several months the Army will, in all probability, have constantly before it the task of defending and supporting an augmented program of national preparedness. This program, made necessary by the unsettled and critical condition of world affairs, will, in all likelihood, cover a period of several years. It is obvious that such a program must be well thought out as to general objectives and must be supported by sound and effective reasons. It is also obvious that the Army, certainly in so far as the higher officials are concerned, should support this program as a unified team.

The study recently submitted to the President gave cost data on a four-point, two-year program consisting of (1) augmentation of air force to 10,000 airplanes of which 50% would be on an operating status; (2) procurement of the equipment, munitions and supplies essential to the support of the Protective Mobilization Plan Army; (3) aids to industrial mobilization; (4) increases of ground forces to the extent of some 58,000 men for the Regular Army and 35,000 men for the National Guard. While the study did not take the form of definite recommendations to the President, it is believed that he has the right to assume that the Army is supporting these four points since the first three were apparently accepted at the recent Presidential conference and the fourth point was added by the Army.

In order that I may help in furthering our objectives I wish you would have prepared for me a justification of the four-point program as submitted to the President. In addition, if you now feel after further reflection that you favor a different program, I would like to have such a program submitted to me together with the justification for it.

Sincerely yours,

Lewis Johnson

Acting Secretary of War.

General Malin Craig
The Chief of Staff

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WAR DEPARTMENT
WASHINGTON

MEMORANDUM

Subject: Army Two-year Augmentation Program.

I - General Considerations

1. Democracy in Europe has weakened before the aggressive tactics of the combined dictatorships. These latter States are penetrating economically and politically into Central and South America. The United States has announced its intention of defending the Western Hemisphere against aggression.

2. The above developments have greatly increased the requirements for national defense. The defenses of continental United States, the Panama Canal, the Hawaiian Islands, Alaska and our island possessions in the Atlantic area must be strengthened. Furthermore, we must be prepared to intervene instantly, and possibly unassisted, in any portion of the Western Hemisphere where our vital interests are threatened. The Army we have today is far below the strength contemplated by the National Defense Act and is totally inadequate to carry out these additional tasks without substantial increases in personnel and materiel. At present, it is actually not a serious deterrent to potential enemies; it lacks the necessary munitions; it cannot provide security for the homeland and at the same time provide the expeditionary forces necessary for the defense of the Western Hemisphere.

3. The increases proposed in this program provide, generally, for:

a. The additional aviation required for a powerful, long-range Army air force suited to operations in this hemisphere.

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b. (1) Additional Regular troops to provide the nucleus of a small expeditionary force to be immediately available to seize and defend bases necessary for the operations of naval, air, and land forces. Also, the additional personnel required to complete the components of the ground forces which must be instantly available for the initial protection of our territory.

(2) Additional National Guard units to complete the small expeditionary forces referred to above, and to provide essential components for the effective employment of combined Regular Army and National Guard forces.

c. The procurement of critical items of materiel, which cannot be procured from industry at the times and in the quantities required to equip and maintain even the moderate forces to be provided by the Protective Mobilization Plan.

d. The completion of projects essential to insure quantity production by industry prior to exhaustion of items by the field forces. This involves the placing of educational orders, the modernizing of Government arsenals and plants, the making of factory plans, and the building up of reserves in machinery and strategic materials.

4. The objective of the program is the creation of a small, well-equipped Army, supported by reserves of essential materials and an organized industry. The program is not designed to meet ultimate war needs -- it merely provides essentials that will be required initially in a major emergency. The requirements set up under the four categories cannot logically be considered separately, but must be visualized as one indivisible whole. Air forces are subject to destruction unless their bases are adequately protected by ground forces; ground forces will be hopelessly handicapped without aviation support; both ground and air forces will be unable to compete on equal terms with the forces of major powers unless modern equipment is provided; and vital operations will be seriously delayed, if not prohibited, unless industry can maintain

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a constant flow of munitions to units engaged and those being raised. All the proposed increases look toward the attainment of the same objective -- a balanced Army, which, together with the Navy, will inspire respect for our national policies. The fulfillment of one requirement, without fulfillment of the others, will not attain this objective.

II - Air Force.

5. The increases in the Air Corps are based on the need for an Army Air Corps composed of a strong and balanced combat force with sufficient reserves for effective and sustained operations, and the necessary administrative, supply and training elements. The composition of this force is governed by production possibilities over a two-year period and by our strategic requirements. The force will comprise 5,620 combat airplanes balanced as to types, 3,750 for training and 690 of miscellaneous types. Of the combat types, 2,791 will be operated in tactical units, with the remainder in reserve. The acceleration of pilot training will require the utilization of almost all of the training types; however, some 2,050 will pass to the reserve at the end of two years.

6. Based upon strategic considerations, the following distribution of operating combat airplanes is contemplated:

a. Continental United States (1,649 airplanes): The mission of this force is to assist in the protection of our land and coastal frontiers, and to furnish striking forces which may be required elsewhere in the Western Hemisphere. Operations inherent to this mission will require our air forces to be prepared to operate in support of our ground forces, or in support or in lieu of naval forces in the protection of our frontiers, or against hostile air and naval raids directed against vital areas, and simultaneously to provide a powerful air component for any expeditionary force which may be required by our national policy.

b. Overseas Possessions (1,142 airplanes): The air forces contemplated for Hawaii (457 airplanes) will increase the security of bases for essential operations in the

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Eastern Pacific. The provision of aviation in Alaska (59 airplanes) extends our control in the Eastern Pacific, and provides the nucleus for reinforcements in the event such action becomes necessary as a measure of protection for continental United States. It will also provide what is more important, the opportunity for essential training in the special technique required for the operation of planes in northern latitudes. The forces (575 airplanes) provided in the Panama Canal Zone and Puerto Rico are necessary to assist in the protection of the Panama Canal against hostile naval and air operations from both oceans and against land and air operations from Central and South America. In addition, the aviation facilities provided at these strategic points constitute advanced operating bases for operations to the South. The air garrison of the Philippine Islands (51 airplanes) has not been increased.

7. Airplanes alone will not impress foreign leaders and their general staffs. The absence of or weaknesses in the other two elements required to make an effective air force -- facilities and skilled personnel -- will be well known and accurately evaluated by potential enemies. Some important aspects of these three elements are discussed in the succeeding subparagraphs:

a. Airplanes: 8,041 additional airplanes will be procured by the end of 1941 -- approximately 1,000 of this number will be produced in Government-owned plants. The facilities of commercial plants will be utilized to the maximum, with due allowance for naval needs and the maintenance of foreign and domestic markets. The establishment of seven Government-operated factories will provide a reserve production capacity of approximately 10,000 airplanes annually in addition to commercial resources. Provision has been made for research and development -- such provision is essential to provide aircraft equal or superior to those of any other nation. Reserves of both combat and training airplanes should be on hand for use in a war emergency -- reserves of combat airplanes to meet losses and reserves of training airplanes to meet increased training requirements and also to permit industry to concentrate on the manufacture of combat types. These reserves are essential to prevent our aviation component from dwindling to a dangerous level before industry can meet requirements.

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b. Facilities: The establishment of new facilities will be kept to the minimum, consistent with efficient operation and maintenance. Full use will be made of existing installations. The aviation forces in the United States, Hawaii, and the Panama Canal Zone will be greatly increased. New units will be assigned to our strategic outposts in Alaska and Puerto Rico. These increases demand a corresponding increase in munitions and facilities. Air forces are highly vulnerable when concentrated on the ground -- dispersion on a number of fields is essential. Each additional operating field sets up requirements for additional gassing and runway facilities. From a mechanical operating standpoint, the number of combat airplanes we can keep in the air is dependent on the adequacy of maintenance facilities -- shop and shop equipment must be available. Bombardment aviation is useless without bombs, which require a long time to manufacture. An adequate initial supply must be on hand on the outbreak of an emergency. Provision must be made in peace for storage and care of these bombs.

c. Personnel:

(1) Airplanes are useless without the personnel required for their operation, storage, and maintenance. Experience indicates the personnel required for the various types of airplanes. The effective use and care of the airplanes (half in reserve) in the Two-year 10,000 Airplane Program will require 7,904 officers, 1,200 flying cadets, 72,713 enlisted men. Of this number, approximately 1,365 officers and 10,524 enlisted men must be provided by increases in other arms.

(2) The procurement of pilots and enlisted specialists is the most essential and at the same time the most difficult part of the personnel problem. Utilization of commercial resources is necessary for a prompt solution. There are numerous civilian pilot schools operating throughout the United States. These can provide primary training for flying cadets -- but they cannot turn out combat pilots. To qualify in this respect, the cadet must pass through thorough courses of

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training at the Air Corps Training Center and in tactical units. Civilian schools can aid materially in reducing the load on Army schools and in weeding out the unfit. But even with this assistance, Air Corps training facilities and combat units will be taxed to the utmost in carrying out this phase of the program. The training of enlisted specialists presents much the same problem as the training of pilots. Here again Army facilities cannot be economically expanded to carry the load and we must resort to the use of civilian and Government-operated specialists' schools if we are to keep our airplanes in operating condition. Certain types of purely military specialists must be trained at the Air Corps Technical School.

(3) We must step up our output of pilots and mechanics, but we must at the same time maintain the present high standards of proficiency for this personnel. A defective airplane may make a casualty of the most skilled pilot -- a poorly trained pilot will most certainly, sooner or later, wreck the best airplane.

III - Ground Forces.

8. The ultimate ejection of overseas enemies from the Western Hemisphere and the ultimate defense of our own territory rest with the ground forces. To neglect this component is to ignore every lesson of history. Therefore, this program provides for the augmentation of the ground forces of the Regular Army by approximately 58,000 and the National Guard by approximately 36,000.

9. The following factors indicate, in general terms, the urgency and need for this increase:

a. Present world conditions, that have dictated the Naval expansion Program, the projected increase in the Army Air Corps, and the recent definition of our foreign policy, present new and serious problems for the ground forces of the Army.

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b. The Panama Canal Zone, which is the keystone of the defense in the Western Hemisphere, must be made impregnable. Hawaii must be strengthened to provide secure bases for the operation of naval and air forces. Puerto Rico must be maintained as an outpost for guarding the Panama Canal and the Caribbean area, and as an advanced base and stepping stone for operations on the East Coast of South America. Alaska must be considered as an outpost for protecting the United States from naval and aerial raids. A small well-equipped and seasoned expeditionary force must be available to seize promptly and to hold the bases that would be essential for the initial operations of our naval, land, and air forces. The Continental United States must be made more secure. The National Guard must be organized to supplement promptly the Regular Army, in order to provide the balanced forces required. Wherever the necessity for immediately available, seasoned, and experienced troops is not vital, National Guard units have been substituted for Regular Army organizations, to lessen the expense involved.

c. The tasks to be performed by our armed forces incident to hemisphere defense or in any other major emergency will require the coordinated efforts of all components of the Army and the Navy. Air and naval forces alone cannot accomplish these tasks. Present day world conditions requiring the proposed expansion of the naval and air forces, and the need for greater security for our own territory, all dictate the need for augmented ground forces if we are to safeguard our interests and be able to use effectively the naval and air forces contemplated.

10. Brief discussions of the salient features of this portion of the Augmentation Program are contained in the succeeding subparagraphs:

a. Panama Canal Zone. Approximately 11,100 additional troops are provided for the Panama Canal Zone, together with an Infantry Brigade, to be withdrawn from the United States. These troops are essential for anti-aircraft and seacoast defense and to protect the Canal and the air bases there from raids and sabotage.

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b. Hawaii. Approximately 3,900 additional Regular Army troops are needed for the minimum defense of the naval base at Oahu. The major part of this force is for manning of anti-aircraft and seacoast armament. Additional troops required, other than those locally available, will be maintained in Continental United States for prompt dispatch to Hawaii in an emergency.

c. Alaska. Approximately one Infantry Battalion with service detachments is needed to guard the new air base to be established in Alaska. The major part of this force will be withdrawn from Chilkoot Barracks or from some station in Continental United States.

d. Puerto Rico. Approximately 725 additional Regular Army and 750 additional National Guard troops are needed to guard the new air base to be established in Puerto Rico.

e. Expeditionary Force. Approximately 29,200 additional troops are required for the Regular Army to provide a small expeditionary force to secure bases that will be immediately needed for the effective employment of our naval, land, and air forces. The initial force would have to be expanded as National Guard forces become available for use. Some of the Regular Army units needed for an expeditionary force do not exist in the present Regular Army. Others could not be withdrawn promptly from forces now available in the Regular Army without jeopardizing the security of the United States. National Guard units are included in the organization of this force as far as consistent with the essential requirement that the major part of this expeditionary force be immediately available.

f. Continental United States.

(1) Approximately 13,500 additional troops for the Regular Army and 30,200 for the National Guard are essential to permit the Regular Army and the National Guard to provide: additional reinforcements that must be available for prompt dispatch to our overseas possessions; additional expeditionary forces that will be required for operations essential to the

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defense of the Western Hemisphere; and troops for the defense of continental United States, including antiaircraft protection and the defense against internal disorders. The additional forces for the National Guard include 14,000 for antiaircraft defense and 16,000 to provide units, mostly corps and army troops, that would be essential for the effective employment of the ground forces of the Regular Army and the National Guard in any major emergency -- units that are not now available from the active components of the Regular Army and the National Guard.

(2) The defense of our overseas possessions, especially Panama and Hawaii, and the availability of a small, well-equipped expeditionary force are of major importance to our national welfare. However, our war-making power, and our very existence, are dependent on the security of continental United States. It is, therefore, essential that we be prepared to meet these other requirements without reducing the forces in continental United States to a level that might jeopardize our existence as a free nation.

11. Procurement of the additional ground forces required must be synchronized with the other increases proposed in this program.

IV - Equipment, Munitions and Supplies.

12. The Protective Mobilization Plan provides for expanding our existing Regular Army and National Guard, within a period of five months, into a force of 1,000,000 men, 730,000 of whom will be in units. Modern arms and equipment are the urgent requirements to make this force effective. Given immediately available modern materiel, the United States can capitalize the tremendous advantage it has in the quality of its manhood. Without this materiel, the man, however splendid the type, is impotent. It is essential that the importance of the time element in our present situation be thoroughly understood -- should we have to take military action in the future it will be matter of days and weeks and not

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a year or more as in the last war. Many critical items of materiel are not available from commercial sources and require a year or more to produce. Therefore, these items, in the quantities required, must be on hand at all times. It is unthinkable that our first war Army, largely National Guard, should be compelled to take the field with antiquated weapons, when we have, tested and available for immediate production, the most modern types.

13. In correcting our deficiencies of critical munitions and equipment, most of the materiel obtained would be of a relatively enduring nature involving a minimum of maintenance and storage costs and subject to limited obsolescence. In procuring such items, we get the maximum benefit possible from each dollar expended.

14. Some of the more important critical items which should be immediately available for the forces mobilized under the Protective Mobilization Plan include antiaircraft guns and equipment, semi-automatic shoulder rifles, infantry mortars, antitank guns, modernized artillery, seacoast defense materiel, tanks, gas masks, powder and ammunition. The situation with regard to a few of these items is presented below:

a. Antiaircraft Materiel. In time of war, the need for antiaircraft equipment will be immediate and enormous. The antiaircraft regiments of the Protective Mobilization Plan will be needed immediately in order to provide minimum antiaircraft protection for our vital installations. There is no substitute for antiaircraft equipment. The nature of this materiel is such that many months are required to produce it. The only way to insure the most essential antiaircraft protection in time of emergency is to have the necessary equipment available when the emergency begins.

b. Semiautomatic Shoulder Rifles. Our standard single-shot rifle is now 35 years old. The new semiautomatic shoulder rifle increases the fire-power of the individual approximately 2 1/2 times. By the end of this fiscal year, we will have only 70% of the number of these weapons required for the troops to be mobilized under the Protective Mobilization Plan. Early provision of our shortage in this weapon will insure a tremendous increase in our defensive power.

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c. Antitank Gun. The lack of a suitable antitank weapon has been one of our outstanding deficiencies. We have recently developed an antitank gun which has proved very satisfactory. In order to meet any threat from hostile mechanized forces, it is essential that our troops be equipped with this new gun. At the end of this fiscal year, only 26% of the requirements of the Protective Mobilization Plan will be on hand.

d. Modernized Artillery. Twenty years after the close of the World War finds us equipped with the same type of artillery which we used during that war. We have adapted many of our artillery carriages for high speed so that they can be moved more rapidly by modern motor transportation, but this improvement in itself has given us no increase in range and power. Increased range and power can be secured by further modernizing guns now on hand. The urgency of this need is indicated by the fact that we now have only 133 modernized 75 mm. guns to meet a requirement of 1,516, and 4 modernized 155 mm. guns to meet a requirement of 130. It takes 4 to 5 months to modernize a gun. With existing facilities, it would require approximately 2 years to meet requirements for these items. There is also an urgent need for a lighter type howitzer for use as divisional artillery.

e. Seacoast Defense Materiel. Our seacoast defenses should be provided with the essential requirements, on a minimum security basis, of armament, communication and other vital installations needed to provide an adequate defense for Hawaii and the Panama Canal, and a reasonable defense for the continental United States. The West Coast defenses are being taken care of to a large extent. But a serious situation exists with regard to the defenses along our Atlantic seaboard, for which adequate appropriations have been lacking for years.

f. Powder and Ammunition. The early replacement of World War powder is a matter of urgent necessity. This powder is deteriorating rapidly and all of it must be replaced in the near future. The shortage in ammunition to meet the requirements of the Protective Mobilization Plan is most acute. An adequate supply of ammunition is needed for weapons now on hand, as well as for the modern weapons which are required to equip properly the units of the Protective Mobilization Plan.

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V - Industrial Mobilization.

15. In the preceding paragraphs, the importance of reserves of critical items of equipment have been indicated. Only two methods of supplying the armed forces with essential equipment are possible: namely, war reserves provided in peace, and new production after the outbreak of war. The cost of a war reserve, complete in all critical items, would be prohibitive. Consequently, dependence must, to a large extent, be placed upon the second of these alternatives -- preparation of industry for its mission of new manufacture after war begins. The chief elements of this program of industrial mobilization include educational orders to private industry, the rehabilitation of Government manufacturing arsenals, provision for accelerating the completion of all plans for war procurement, a reserve of critical manufacturing equipment for use only in war, and a stock pile reserve of strategic materials.

16. Details regarding the above-mentioned elements are given in the succeeding subparagraphs:

a. Educational Orders: Educational orders have been found the most satisfactory method of preparing, for its scheduled war production, those private plants upon which dependence must be placed for over 90% of the contemplated new manufacture. This method saves months in obtaining quantity production in war. The proposed program of educational orders includes all critical items of equipment and carries preparation for their manufacture as far as is deemed practicable in peace. In considering the matter of educational orders, it should be understood that the mere presence of the machinery in proper arrangement is not sufficient. The technique of manufacture is 80% of the problem, particularly as to rapidity of production, and it is only acquired by the actual business of producing. Therefore, many plants in this country should be kept in production in a small way on critical items of war materiel. No substitute method for this procedure has been found.

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b. Government Arsenals: The rehabilitation of manufacturing arsenals, primarily Ordnance and Chemical Warfare establishments, is important in order that methods of producing non-commercial items of equipment may be developed in peace for utilization by private industry when called upon in war. The maintenance of these establishments in a thoroughly modern and efficient condition is, therefore, essential.

c. Planning: Much important work remains to be done by the War Department in surveying the capacity of private industry to produce munitions, and in preparing such plans for war production as are not obtainable in any other way. The program, therefore, includes provisions to enable this essential work to be accelerated.

d. Manufacturing Equipment: The lack of manufacturing equipment, particularly special machines for munitions of a non-commercial character, will delay the new production program greatly unless steps are taken in peace to meet the situation. For this reason, the industrial mobilization program includes provision for obtaining and placing in reserve certain of the special equipment that is most critical and which will remain standard indefinitely. In this way, it is anticipated that one additional choke point in war production will be overcome, in part at least.

e. Strategic Materials: The world struggle today for raw materials indicates the difficulty that may be experienced by this country in an emergency in obtaining those commodities in which we are deficient and which are essential to war production as well as to industry generally. A moderate stock pile of those essential materials, the supply of which is most likely to be interrupted in war, is, therefore, included as an essential element of the plan for industrial mobilization. The proposed reserve of raw materials is intended to provide for the needs of the armed forces and, if possible, a part of the normal commercial requirements.

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17. All items of the program for industrial mobilization above mentioned are, therefore, a part of a well-rounded plan. None can be dispensed with without weakening the program materially.

VI - Conclusion

18. This memorandum is limited to a broad justification of the Two-year Army Augmentation Program. Other documents have presented the details of the four categories of the program, with the estimated costs. The augmentation proposed must be viewed in the light of the threats inherent in the present international situation and the consequent danger to our national existence. Developing foreign aggression may presently require strong defensive measures to hold our territory inviolate and combined offensive action by mobile air and ground forces to eject the aggressor from Central and South America. Prompt action may be imperative to prevent the establishment of large enemy forces in the Western Hemisphere. Inability to act promptly may, in the end, require of us a long and costly major war effort.

19. The entire program must be considered as an integrated whole. Each one of the categories set up -- air forces, ground forces, materiel, and industrial mobilization -- is an essential part of our national defense structure. Weakness in any major part of this structure may cause the whole to collapse.

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PSF: Justice

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

December 28, 1938.

DEC 29 11 50 AM '38

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MEMORANDUM FOR THE PRESIDENT:

Complying with your instructions to determine the requirements of the air program for storage for inactive airplanes and maintenance of active aircraft, I find that they can be met by the expansion of the two existing air depots at Sacramento and San Antonio, and the construction of four new depots at Ogden, Utah, Dayton, Ohio, New Cumberland, Pennsylvania, and at a site to be selected in the Atlanta-Birmingham area.

Since no further legislative authority is necessary, projects for the construction of these six depots are being prepared with a view to substituting them for the seven projects for aircraft factories recently submitted to the Works Progress Administration.

The estimated cost of the depot program is approximately \$37,000,000.

Lawson Johnston

PSF. Re-lation

WAR DEPARTMENT
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D. C.

January 6, 1939.

MEMORANDUM FOR THE PRESIDENT.

In accordance with your instructions at the conference of January 5, 1939, I am enclosing a suggested paragraph for inclusion in your National Defense message on the subject of Educational Orders for the Army.

Enclosures

Louis Johnson

SUGGESTED PARAGRAPH ON EDUCATIONAL ORDERS

Educational Orders for Munitions: In addition to the funds recommended for the procurement of a portion of Army requirements in certain critical items of equipment, I consider it necessary that such procurement be supplemented by measures designed to prepare industry for the quantity production in an emergency of those military items noncommercial in character and so difficult of manufacture as to constitute bottlenecks. For this purpose the Educational Order, authorized by Public - No. 639 - 75th Congress, is considered an effective instrument. In order, therefore, that essential private industry may receive necessary training for national defense, I recommend that there be authorized and appropriated for the fiscal year 1940 the sum of \$32,500,000 for Educational Orders for the Army.

[PUBLIC—No. 639—75TH CONGRESS]

[CHAPTER 458—3D SESSION]

[H. R. 6246]

AN ACT

To provide for placing educational orders to familiarize private manufacturing establishments with the production of munitions of war of special or technical design, noncommercial in character.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is hereby authorized to place educational orders for munitions of war of special or technical design, or both, noncommercial in character (hereinafter called "special munitions"), and essential accessories and parts thereof needed in the military service, with commercial concerns to familiarize commercial and manufacturing establishments with the manufacture of such munitions and such accessories and parts. In arranging for placing such educational orders, bids shall be solicited only from such establishments as, in the Secretary's judgment, will be competent in time of war to manufacture the particular class of special munitions with respect to which the bid is solicited. In the determination of which classes of special munitions are to be manufactured under this Act, and in the determination of which of the solicited bidders is to be awarded any contract, the Secretary shall have regard solely to the selection of such classes of special munitions and of such bidders as will, in his judgment, under all the circumstances, best serve the interest of the United States and best promote the cause of national defense. The Secretary of War shall enter into no contract under this section without the approval of the President.

SEC. 2. That the first of any such educational orders placed with any person, firm, or corporation for supplying any such munitions, accessories, or parts, may include a complete set of such gages, dies, jigs, tools, fixtures, and other special aids and appliances, including drawings thereof, as may be required for the production of such munitions, accessories, and parts in quantity in the event of an emergency. The title to all such facilities shall remain in the Government of the United States.

SEC. 3. That not more than one such educational order for the manufacture of the same, or substantially the same, article of special munitions shall be given to the same person, firm, or corporation within any period of three successive years. This section shall not prohibit the awarding of any contract during any war in which the United States is engaged.

SEC. 4. That, to carry out the provisions of this Act, there is authorized to be appropriated the sum of \$2,000,000 during each of the five fiscal years beginning with the fiscal year during which this Act is enacted.

Approved, June 16, 1938.

PSF *London*

January 24, 1939

*John
F. Johnson
1/24/39*

Dear Mr. President:

The enclosed confidential report and the evaluation of the British airplane situation is so timely that I thought you might want to look at the marked paragraphs on the first page and the last ("Conclusion") paragraph.

The British shortcomings certainly emphasize the correctness of your program.

Faithfully yours,

Paul Johnson

The President
The White House

Enclosure

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Intelligence Branch
Military Intelligence Division
General Staff

Date Jan. 19, 1939

R.S. File 2083-1597/12

I.G. No. 8610

(Indicate if
Secret, Confidential or Restricted.)

British Empire Section

Summarization and Evaluation of Report No. 39854
from M. A., London

Subject: British "Shadow" Aircraft Factories.

SUMMARIZATION. This very complete report covers the entire history and present development of the British "shadow" system of aircraft production.

Faced with the need for air expansion the Air Ministry early in 1936 decided to augment the production capacity of aircraft firms by means of government-owned factories erected and operated by motor car companies. It was intended that these plants would manufacture planes from time to time and remain idle the rest of the time. (This idea has been dropped for the present due to the accelerated air expansion.) Six factories were built, with complete planes produced in two and engines and parts in the others. One light and one medium bomber, each powered with the same engine, were to be produced. Ground for one airplane factory was broken in July 1936; first plane was produced in July 1938 (24 months); plant was on a production basis in October 1938 (27 months); is now producing eight planes a week (30 months); and should produce 15 a week by July 1939 (36 months). The second plane factory was started four months later and has just produced its first plane (26 months). Engine production took nearly a year less and is now far ahead of plane production. Air Ministry sources believe that this rate of plane production could be bettered in the United States due to an advanced state of aircraft engineering.

Due to experience with the "shadow" plants the Air Ministry has adopted the new policy of entrusting further expansion to the aircraft industry (with one exception) and in 1938 authorized the construction of six new factories and extensions to eight old plants. In addition it has approved an extensive system of sub-contracting.

COMMENTS BY M/A: As a result of his own observations and extensive inquiries the Military Attache made the following comments:

a. Motor car firms were selected to manage the "shadow" industry because they had the only executives familiar with mass production. They have made a success of aircraft engine production because the problems were similar to those of the motor industry; but aircraft production has not come up to expectations. It cannot be said for certain that aircraft firms would have done better.

b. There is general agreement that if an expansion of aircraft production should be undertaken again it would be entrusted to the aircraft industry; a number of advantages of this system are listed.

c. The principal cause of delay in the general program was not the expected shortage of machine tools and of raw materials but the lack of suitable skilled labor which has been the bottleneck of the whole rearmament program.

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London,

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WAR DEPARTMENT

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GREAT BRITAIN (AVIATION)

1000.9 (9/27/58)

Subject: Aircraft Production (Non-governmental)

Date- 8-7-70

Signature- *Ad*

British "Shadow" Factories

RECEIVED G/1 W. D. JAN 16 1939

Reference letter G-2/2083-1597, dated Oct. 31, 1938, Subject: British Shadow Factories, there follows as much of the information as is available and as far as possible in the desired sequence.

It may be well to review the shadow industry from its inception.

The recruiting of a number of motor car companies to operate shadow airframe and engine factories which would be financed by the government was the idea of Lord Weir who was an unpaid adviser to the Secretary of State for Air, Lord Swinton. He believed that the experience which had been gained in mass production of motor cars could be applied to speed up and increase the production of airframes and engines.

The original firms which, on the invitation of the Secretary of State for Air, agreed to cooperate with the Air Ministry were:

- The Austin Motor Co. Ltd.
- The Daimler Co. Ltd.
- Rootes Securities Ltd. (Hillman, Humber etc.)
- The Rover Company Ltd.
- Singer and Company Ltd.
- The Standard Motor Company Ltd.
- The Wolseley Motors Ltd.

Cooperation was to be established by means of a body known as the Aero Engine Committee which was formed on April 7, 1936, with Sir Hubert Austin (head of Austin Motor Co. Ltd.) as Chairman.

The scheme was that the Air Ministry would erect and equip six government-owned factories which would be operated in time of emergency by the above mentioned firms. When the emergency ceased to exist, these factories would revert to the Government to be maintained by caretakers until such time as they might again be needed.

The production plan for these "shadow" factories submitted by the Aero Engine Committee was that each of the new plants should manufacture a different group of parts for Bristol engines. The assembly of these parts and the test of complete engines should be undertaken by two factories only. Airframes were to be manufactured in the factories managed by Rootes and Austin. The Air Ministry believed that it would be better for certain factories to manufacture complete engines so that in the event of failure of even one factory

From M.A. London

Report No. 39854

January 4, 1939.

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to produce or deliver its components it would not completely disrupt production. However, it finally approved the Committee's recommendations. The Committee's principal argument was that it would be less difficult to equip each factory with only the machine tools necessary for the parts which it was to produce, and that to equip each factory with all the tools necessary to produce complete engines would delay the program.

Lord Nuffield, head of Wolsley Motors, Morris Motors etc., had in 1934 or 1935 built an aero engine factory at a cost of £500,000. (\$2,500,000) and was anxious to build any engine, British or foreign, that the Air Ministry might select. He would not agree, however, to produce anything less than the complete engine. However, due to disagreement with the Air Ministry on this and other points he withdrew Wolsley Motors Ltd. from the shadow factory group. (Our Report No. 38364, Nov. 11, 1936).

A little later, the Singer and Company Ltd., for some reason or other, which is not important, also withdrew.

The companies now cooperating with the Air Ministry and acting as agents in the operation of the six original shadow factories are:

AIRFRAMES

The Austin Motor Co. Ltd. (Manufacturing Fairey "Battle")
Aircraft Works: Longbridge, Birmingham.

Rootes Securities Ltd. (Manufacturing Bristol "Blenheim")
Aircraft Works: Speke, Liverpool.

ENGINES

The Austin Motor Company Ltd. (Bristol "Mercury VIII") (Aero engine components)
Works: Longbridge, Birmingham.

The Bristol Aeroplanes Co. Ltd. (aero engines).

The Daimler Co. Ltd. (Aero engine components)
Works: Coventry.

Rootes Securities, Ltd. (Aero engine components)

The Rover Co. Ltd (Aero engine components)
Works: Coventry.

The Standard Motor Co. Ltd. (Aero engine components)
Works: Coventry.

Shortly after the initiation of the project, the following additions to the shadow scheme were made.

CARBURETORS

H. M. Hobson (Aircraft and Motor Components) Ltd.
(Claude Hobson Carburetors with automatic boost and mixture controls)
Works: Oldham.

The Standard Motor Co., Ltd., Works: Coventry.

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AIRSCREENS

The De Havilland Aircraft Co. Ltd. (Hamilton Propellers)

Works: Bolton.

As most of the shadow factories are producing components for the Bristol engine it is not possible to give production figures except for those assembling and testing complete engines and those producing airframes.

As the factory operated by the Austin Motor Company Ltd. produces both airframes and engines, and is in production on both, it may be used as a guide to the average time taken by each of the others to get into production.

Ground for the aircraft section of the factory was broken in July 1936.

Factory, with about 780,000 sq.ft. floor space began operating about August 1937.

First airframe was completed toward the end of July 1939, and the factory was operating on production basis in October.

To date, about 40 Fairey "Battles" have been produced.

Production, which at the moment is about eight (8) machines per week, will steadily increase and should reach about 15 per week by June or July, 1939.

According to the Deputy Director General of Production, Air Ministry, one of the causes for delay at Austin plant was that the Fairey Company could not supply production jigs and tools as they themselves were not yet on a production basis.

The engine factory was started about one month later, namely, in August 1936 and was producing crank shaft and reduction gear assemblies and assembling complete engines in August or September 1937.

Its present production is about 30/35 engines per week with an anticipated production of 50 complete engines per week.

Due to politics there was considerable delay in the selection of the site for the factory to be operated by Rootes Securities Ltd., with the result that ground was not broken until three or four months later. They are now just producing their first Bristol "Blenheims" and should be getting properly under way in the next few months. The Rootes factory has been turning out engine components for some months.

The factory for the assembly of engines operated by the Bristol Company has been producing engines for almost a year and is turning out about 35 complete engines per week.

NOTE: These figures on production of engines both at Bristol and Austin supersede and cancel previous estimates.

The other factories were all started about the same time, July 1936, and took about the same length of time to get into operation.

Each of the engine factories are employing in the neighborhood of 1200 men.

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London.

Rootes and Austin airframe factories must each employ more than 3,000 men.

The rate of production of completed engines will depend on the proper flow of components from the various factories.

Air Ministry sources have supplied the following data as a guide to the time taken to attain a productive rate in a shadow factory organization manned by personnel taken from another branch of engineering, at a time when the ordinary commercial engineering industry was in a state of considerable activity. They express the belief that these figures, which follow, should be bettered in the United States where the production of the modern type of airplane is in a more advanced state than it was in England at the time the expansion program was undertaken.

1. The first airplane may be expected in 27 months from the date on which the order is given to commence the shadow factory.
2. Three years will elapse before the production is on a par with the parent industry in man hours per unit of construction.
3. The provision of floor area in the shadow factory should not exceed nine months.
4. Tools should be available and installed in approximately 12 months.
5. The training of personnel occupies about 15 months.
6. Production should be obtained in 9 to 12 months from the date of completion of jigs and tools.

These remarks apply to airframe shadow factories. The organization and establishment of shadow factories to make engines has proved to be much easier, in part due to the similarity between aero engine and motor car engine production. In this case it has been possible to bring a factory into operation in just over 12 months from the commencement of the project and to achieve a steady flow of engine production in less than two years.

The average wage paid in aircraft factories is approximately 1/8d. (\$.40) per hour and in the engine factories 1/10d. (\$.44) per hour."

The management of the shadow factories is done on an agency basis and the Secretary of State for Air contracts to repay to the agents the net cost, which is defined in the agreement as the actual net cost properly incurred, having due regard to economy and efficiency and subject to all discounts, rebates, etc. The net cost is not to include any payments in respect of the services of the Directors or of the heads of such departments of the firms as may be agreed.

The agents are remunerated by management fees which take the form of (a) a fixed amount payable with respect to the construction period and (b) a sum of £200 (\$1000.00) or £225 (\$1125.00) per airframe and £75 (\$375.00) per engine produced. An incentive to economy in production is provided by a bonus scheme under which the agents will receive a share (ranging from 12½ per cent to 17½ per cent) of the sum by which the ascertained net cost is less than a basic price. The basic price

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being mutually agreed, if possible, following the costing of one or more of a fixed number of "batches" (10 to 25 units) of airframes or engines produced. Failing agreement, the ascertained net cost of the last of these earlier batches will become the basic price.

The agreements contain break clauses which prescribe the compensation to be paid in the event of their coming into effect and they can also be terminated on due notice upon the failure of the agents to carry out their obligations.

The method of arriving at unit price of airframes or engines by the costing of one or more "batches" is explained in our Report No. 39484, June 11, 1938.

A high official in charge of production further made statements as follows:

"In introducing a greatly accelerated programme of aircraft production by means of shadow factories, it has to be borne in mind that the load to be carried by these factories in the way of supplies of labour, tools, equipment and directing personnel is additional to and not a development of the normal trade conditions. For this reason any plans made for an extension of airplane production must be based on prevailing commercial conditions.

"The supply of jigs and tools may prove a difficulty if the ordinary engineering industry is fully employed in commercial work and due account of this must be taken in making any forward plans.

"The supply of materials, although not a determining factor, certainly has been a difficulty due to the fact that the materials used in airplane and aero engine construction are not commonly used for any other engineering projects and special steps had to be taken to increase the supplies. However, it had not, here, been necessary to establish any priority for the Air Force as materials required were little used for Army or Navy purposes."

He emphasized that above all one must not be too optimistic and one must not let their politicians mislead the people by over-optimistic statements regarding progress of production.

"Labor", he stated, "can only be recruited in a given area to the extent of local supply, the potential housing capacity and the transport facilities for the induction of labor from other districts." Another point which he stressed was that, "Labor can only be introduced at the rate at which experienced personnel is available to train it."

His remarks which follow are of the highest importance:

"Experience in this country has been that the rate at which labor can be taken on and trained has determined the rate at which the output of airplanes and engines can be increased, and for this reason it has been our experience that extensions to existing aircraft factories or the establishment of new factories under the management of existing aircraft organizations has proved more effective from a production point of view than any other arrangement." (Namely "shadow" scheme).

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While this official believed that the motor car industry could be used, with success, to assist in increasing the production of aircraft engines, he thought however that it was better to assist the established aircraft engine companies to extend their plants for increased production and unquestionably better to leave the production of airframes to established and approved airplane manufacturers. He cited the method adopted by Rolls Royce to increase production. Factory was extended as limited space available permitted. Then Rolls enlisted the aid of various recognized and reputable engineering firms in the district to produce various parts on sub-contract. Rolls engineers and technicians were loaned to these sub-contracting companies to instruct their personnel in the production of the parts on order. By this method Rolls was able to use the floor space, which would otherwise have been needed for manufacture of these parts, for additional assembly space.

As a result of their experience with the shadow industry the Air Ministry have decided to entrust future expansion to the aircraft industry itself, making an exception, however, in the case of Lord Nuffield who will operate a shadow factory now under construction. At this factory, the Supermarine "Spitfire" will be produced in great numbers.

The following extensions and new factories have been authorized in 1938 and are in course of construction:

Extensions to:

The Bristol Aeroplane Company's works at Bristol.
Handley Page works at Cricklewood.
Fairey Aviation Company's works at Stockport.
Westland Aircraft works at Yeovil, Somerset.
Short Brothers, Rochester.
Short and Harland, Belfast.
Rootes "Shadow" Factory to be increased by 40 per cent.
Airspeed (1934) Ltd., Portsmouth
Phillips & Powis, Reading.

New Factories

Gloster Aircraft Co., Ltd., at Gloucester.
Hawker Aircraft Ltd., at Slough, Bucks.
A.V. Roe and Co. Ltd. at Chadderton, Lancs.
Rolls-Royce Ltd., at Crewe
Vickers-Armstrong Ltd.
Nuffields, Birmingham.

From M.A. London

Report No. 39854

January 4, 1939.

Martin F. Scanlon

MARTIN F. SCANLON,
Col. (temp.), A.C.,
Asst. Military Attache.

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The Military Attaché
London.

Date- 8-7-78

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Office of the Military Attaché, American Embassy, London, England.
January 4, 1938. To: A. C. of S., G-2, War Dept., Washington, U.S.

The foregoing document has been put together from various sources, most of them extremely authoritative.

The general feeling in the Air Ministry, among officials concerned with production and much more so among others, seems to be that the country would have done well not to have launched the so-called shadow industry but to have concentrated on expanding the existing airplane industry to the utmost. An exception is made, of course, as regards engines. To the manufacture of these the motor industry, it is conceded, was well adapted. This feeling is even more strongly held in the air industry itself, who, at one time, after a long period of starvation, saw the prize for which they had been struggling suddenly awarded, as they thought, to a lot of outsiders who after the emergency had passed would be in a position to monopolize the air industry.

There is no doubt that Lord Weir's proposal was originally made on account of the fact that, as has previously been pointed out by this office, the philosophy and practice of mass production has never taken root in this country, save in the factories of a few automobile manufacturers. It is thought that, for this reason, when great numbers of planes and engines were going to be needed, Lord Weir instinctively turned to the only quantity producers in the United Kingdom for help.

It seems probable that this step had some good results for a time, for there is no question that some managers and executives in the existing aircraft industry were slow in visualizing thousands of planes in the place of dozens. The advent of mass production ideas from the motor industry helped to make this transition.

However this may be "it is noticeable that the Air Ministry is now relying more on the professional aircraft companies to manage these factories than it did when the shadow scheme was first adopted x x x The Ministry's early practice of enlisting shadow factory managers without first-hand experience of aircraft manufacture, it is not perhaps unfair to surmise, has led to some disappointments" - The Economist, Nov. 26, 1938.

It should be remembered that Lord Weir's resignation was accepted at the same time that Lord Swinton stepped out of the Air Ministry, at the request of the Prime Minister.

On this point, however, it is only fair to say that authorities on production are not prepared to say that Lord Weir's experiment has set the production program back, taking it as a whole. They confine themselves to saying that by concentrating on the existing aircraft industry, they would be as well off today.

There seems to be substantial unanimity now, however, that if the job were to be undertaken again it would be by an expansion of the existing air industry.

It is believed that the method adopted would not, however, be by the erection of large numbers of new factories in new locations, but

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but by using existing factories as the nuclei of large subcontracting areas. That is to say, an aeroplane would be produced by an existing company whose plant would be used primarily, as the source of supervisors, of trained workmen and for assembly, as many parts as possible being farmed out to neighboring engineering works.

This scheme, which is now being adopted, has the following advantages:

(a) it does away to a large extent with the necessity for erecting new plant

(b) it disperses manufacture over considerable local areas, which is a protection against bombing

(c) it avoids moving existing labor. British labor is conservative and by nature averse to being transplanted. In addition, in recent years many of the skilled workmen have been led to buy houses, and these are not easy to dispose of. A marked difference between American and British workmen is that few of the latter own automobiles, so that their ordinary radius of movement is much less.

(d) it obviates the organization and training of an entirely new organization.

In developing this scheme of what might be called "neighborhood production" the central plant has hitherto made its own arrangements with nearby sub-contractors, and only occasionally has the Committee of Imperial Defense been called upon to settle questions of priority. Another point to be noted is that the development is allowed to take rather a natural course, no general survey of firms suitable for executing sub-contracts having been made by the Air Ministry.

In cases where the parent plant is able to carry on manufacture as well as assembly it does so with that part of its equipment which is available. Its most valuable function, however, is as a source of training for personnel of new subcontracting firms. This is done by lending instruction personnel or exchanging workmen for periods as long as necessary. A further factor in its success is the adoption of mobile machine tools with built-in motors which can be shifted about through a production area as required.

It is foreseen that the production areas now in being will gradually reach their capacity point and it is forecast that new ones will successively be started in new neighborhoods.

In discussions of the general program it has been stated to the undersigned that the obstacles which had been foreseen were not those which actually caused delay. Great apprehensions existed at the outset over the matter of machine tools but by going into all markets, including British, Swiss, German and American these were secured on schedule time. Neither was any delay caused by shortages in raw materials, the erection of factories or by the training of flying personnel. The principal stumbling block was the shortage of skilled labor which has been the bottle-neck for the past two years in the whole rearmament program. It can be taken for granted, it is said,

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that the limiting factor is the number of practical instructors who are available. In this connection, it must not be forgotten that labor, as a political party, has never declared itself whole heartedly in support of rearmament and is only going along on a kind of unofficial basis.

Difficulties which have been encountered in Great Britain in standardizing dimensions would probably not be encountered in the United States, but it took some time here to enforce the use of jigs and gauges to ensure the necessary accuracy. A small point, in this connection, is that where more than one plant uses the same jigs, dies, etc., it is best to make them all in one factory and distribute them rather than have each factory make its own.

In the opinion of some well qualified governmental authorities the basic idea of the shadow factory program is unsound, as it had led to an extremely involved system of governmental financing and to the actual ownership by the government of a series of great plants, closely interlocked with private ones. Those who take this point of view are convinced that sooner or later this will be found to result in great waste of public money and, very possibly, in some rescality.

The alternative is to embark on a maximum program with a guarantee of full employment to private industry up to their fullest capacity over a long period, say four to seven years, a guarantee of their access to the necessary raw materials, a guarantee of a fixed profit and a guarantee against loss in case the program should be suddenly stopped.

Under an agreement based on these four guarantees it is believed that the air industry would be able to finance itself from private sources, and so avoid the existing complications in which the Treasury is becoming involved.

In order to further encourage manufacturers, it is suggested that each one shall be entitled to sell, on his own account, any or all of the last ten machines out of each hundred manufactured. This would result, it is confidently asserted, in speeding up production, in securing and holding export markets and allowing the manufacturer to make a reasonable bonus for himself over and above the government guaranteed profit.

In conclusion, the same remarks can be applied to the air rearmament that this office has frequently used with respect to the munitions program, the air defense program and practically all that has been attempted in this country in the direction of readiness for war, i.e.:

The preparedness effort was started two years late,

The initial conceptions and programs were not on a sufficiently large scale,

The politicians, the public and the press, have been too optimistic about the speed with which money can be turned into munitions.

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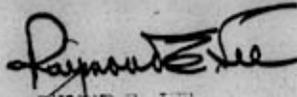
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There was no clearcut and carefully considered plan at the outset and there has been too much improvisation ("muddling") since.



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