THE FIRST REQUIREMENT in warfare is the ability to distinguish friend from foe. Nowhere is this more difficult than in the air. Owing to the great speeds and heights attained by modern aircraft, recognition is frequently dependent on a momentary glimpse. In the same way instant and accurate recognition of surface craft, mechanized ground equipment, etc., is fraught with great difficulties owing to varying conditions of visibility, distance, and variety of types.

Before the outbreak of this war few realized the grave problems of recognition that the increasing dominance of air power would present. The existence of these problems was soon apparent when, after two months, the casualties of the British Advanced Air Striking Force in France amounted to:—Shot down by the Germans, eight: Shot down by the French, nine. In those days the only question asked was, "Is it in range?" Since then mistakes in recognition, on the sea, on land, and in the air have been too numerous to mention. Usually these mistakes are attended by the most serious consequences.

It is now fully realized that the only way to prevent these occurrences is by demanding the highest general level of proficiency in recognition throughout the services. This can only be attained by concentrated study. It is not suggested that practice will make one absolutely perfect, but it will certainly go most of the way toward reducing the chances of a man being a danger not only to himself, but to his comrades-in-arms.

The Navy's problem at sea, whether on warship or merchant ship, is to know as soon as possible whether any aircraft or ship within sight is friendly or hostile, what type it is, and how it is likely to attack, and from that to estimate the best method of defence.

The Army's problems are also varied. Antiaircraft gunners should be able to recognize any airplane within range, or likely to come within range, whether flying directly toward the battery or not. Columns on the move may have to contend with the low-flying attack-bomber or the dive-bomber. Instant recognition saves lives and leads to the destruction of the enemy.

The Air Forces, both of the Army and the Navy, have even more problems to solve because the views from which crews may see the enemy are not confined to those from underneath. The fighter pilot may hope to dive on the enemy from above and behind, but to him the underneath view is important too. The tail gunner needs the head-on view. All must know their aircraft well. In a completely different category are the photographic interpreters who have to recognize the top-plan views of aircraft dispersed on aerodromes or in ports. In the past, too little attention has been paid to this important silhouette. Likewise, the accurate recognition of mechanized ground equipment is of extreme importance.

The Ground Observer Corps has concentrated much attention on recognition. Again any aircraft within view, friendly or hostile, should be recognized quickly—even through a momentary gap in the clouds.

The first thing to be appreciated is that recognition does not begin and end with appearance. Certainly it is essential to distinquish between the appearance of friend and foe; *but this is seldom sufficient*. It is also essential to recognize the exact type. In the

case of aircraft, this recognition gives knowledge of the wing span, approximate speed, probable armament, and if hostile, a reasonable deduction as to future actions. The situation is similar to that of surface-craft, where recognition has a tactical value and gives an idea of what the enemy can do and how he may be dealt with, once recognized.

What enables a person accurately and speedily to recognize tanks, ships, planes, etc.? The process is no different from that of recognizing an automobile, a horse, a bird, or a friend. Let one ask himself the question, "When I see a friend walking down the street, do I look at every feature of him and having gone through a process of analysis, decide that it is Bill?" Obviously not. Recognition is instinctive. One knows immediately that it is "Bill" because one is *familiar* with his whole appearance and general characteristics, such as the way he stands or walks. It is not difficult to translate these characteristics into terms of airplanes, ships, etc. The combination of all these characteristics into the over-all effect of an object is known scientifically as the "total form" of that object. Now one can ask one more question. "Why did you get to know the "total form" of a friend or automobile, or horse?" The answer is, because you were interested in him or it. Therefore, the requirement for efficient recognition is familiarity based on a general knowledge of air or surface craft, or tanks, or other military equipment, a knowledge which will only be gained by an aroused interest and enthusiasm for them. If this is borne in mind, there will finally be an end to those famous last words, "I *think* they're ours."

NOTE:

"RECOGNITION" means VISUAL recognition.

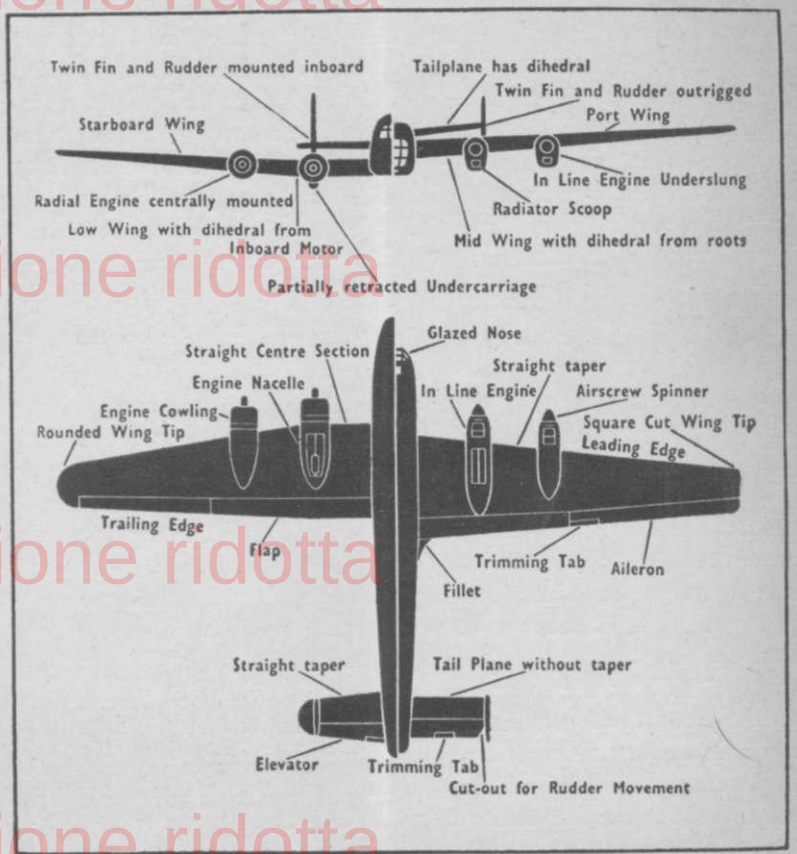
"IDENTIFICATION" means identification OTHER THAN VISUAL.

PICTORIAL MANUAL

The present manual is primarily designed for self-instruction and general use but will also serve as a text in recognition courses. It includes four types of material: black and white silhouettes; wash drawings; photographs; and editorial matter.

Silhouettes are the foundation stone on which all recognition training is based. They may seem dull and uninspiring but the fact remains that the "three-view" silhouette, giving the head-on, plan, and side-view shows every salient recognition feature of a ship or plane just as an architect's drawing of plan, section, and elevations gives the essentials of a building. They are basic diagrams and their value is evident from the accompanying example which shows how great is the contrast between the halves of two different airplanes and indicates in print the facts which an experienced observer can read directly from a silhouette. The wash drawings pick up where the silhouette diagrams leave off. By adding form and detail, they advance toward reality while still conveying accurate facts like engineering drawings. Both types of drawing should be studied for their over-all effect and not just for details. Photographs give the final step toward a realistic impression and show the aircraft, etc., from various angles. The editorial matter is intended to drive home the plane or ship by lending it interest and appeal; also such data are included as can be released.

The material in this manual has been assembled and edited jointly by Army and Navy aviation training divisions. Much valuable assistance has been contributed by the British, particularly in supplying silhouettes. The bulk of the material came from intelli-



gence and photographic sources in both Army and Navy. The data and dimensions are the most exact available. The Army and Navy can release only approximate performance figures for their own planes and ships but the dimensions given have been obtained from their respective design sections. For foreign models, the best available figures are given and, where reliable sources of information differ on dimensions, the more probable figure is given and the less probable one follows it in parenthesis. It is suggested that when figures are definitely confirmed, the necessary corrections be made by the individual holding this book. The manual will be constantly enlarged and amended.

MOTION PICTURES

An ideal form of training would naturally be to see actual aircraft, ships, etc., as often as required until one was entirely familiar with them in all positions and under every condition of visibility. This is clearly impracticable; therefore the training medium which reproduces this ideal with the greatest realism is the moving picture. There are, at present, three types of training film available. The first is introductory and is intended for presentation in the primary stages of training. Its object is to serve as a glossary of terms explaining to the beginner the meaning of such words and phrases as "dihedral", "taper", "underslung", etc. The second kind of film is that dealing with the recognition of individual types of aircraft, ships, etc. This class of film is planned on the principle that it is of basic importance to have detailed knowledge. Flying or action shots are combined with close-up stills, diagrams, and animated drawings, all joining with the commentary to give the visual directive to the human eye which is so essential. This series may be used effectively, provided detailed analysis is not accepted as a final solution to the problem. An airplane, for example, cannot be learned just by memorizing its wings, engines, fuselage, and tail, separately and without regard to the "total form" effect they join to produce; for in recognition the whole is more than the sum of its parts. The third class of film is well represented by the "Quizcraft" Series. This class comprises actual flying shots of various aircraft and is designed for use at a more advanced stage of training. It is not suggested that these films present a serious recognition problem to a man with any degree of training. The primary object is to give the student the opportunity to see aircraft in conditions as nearly as possible approaching reality. Emphasis, therefore, is placed upon distant shots under all conditions of visibility. The "test" element is secondary and only introduced to maintain interest. Training films and film strips are listed in FM 21-7 and in the Catalog of U. S. Navy Training films.

FILM SLIDES AND FILM STRIPS

Film slides and film strips are another means of presenting silhouettes, wash-drawings, and still photographs. By reducing progressively the time of exposing them, it is possible to develop speed in recognition. Time intervals as short as one-fifth second can be obtained with an improvised shutter consisting of a piece of cardboard with a hole in it which is allowed to drop across the projector lens.

FLASH METER TRAINING

This is a development in the method of projecting film slides perfected for use by the U. S. Navy. It has also been adopted, with certain modifications, by the U. S. Army Air Forces. Equipment is used which consists of a slide projector with a flash meter (like a camera shutter). The slides are flashed on the screen at progressively faster speeds up to 1/100th second. At such speeds, the student is forced to recognize an object from its "total form" because there is no time for the eye to scan its parts. The importance of this approach has already been mentioned. This develops a "skill of seeing" and holds the student's attention like a game of skill. For fullest application, a properly trained instructor is necessary.

MODELS AND POSTERS

Sets of scale models of aircraft and surface craft are obtainable in accordance with existing regulations and policies. These models are highly accurate and carefully constructed to scale. Suspending airplane models in various flying attitudes or setting out ship models in formation is all very well as far as it goes, but even more important is it that they should be available to students for examination. They may satisfy themselves, the models being accurate, that certain features do exist which may well have been missed when seeing representations of the aircraft or ship on former occasions. The scale model is eminently suitable as it can be made to adopt any position, whereas the views presented by slides, photographs, and silhouettes are necessarily limited.

Posters are valuable for teaching classes if no projector is available. Posted conspicuously, they constantly refresh the memory.

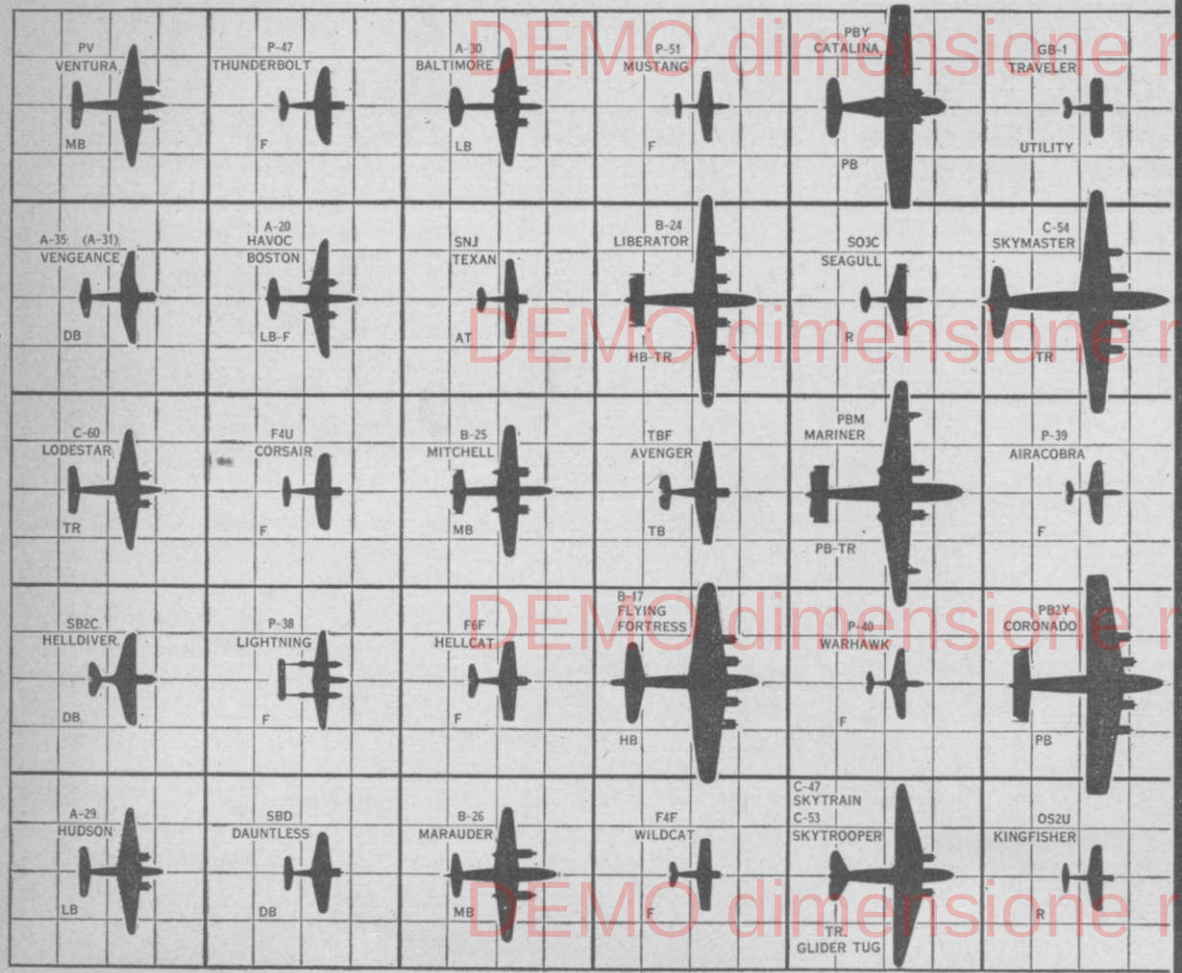
TEACHING RECOGNITION

The above training aids can best be utilized for teaching recognition if training progresses as follows. FIRST, the student is taught the important items of nomenclature using the glossary in this manual, supplemented by the introductory training films and film strips. SECOND, individual planes, ships, etc., are presented, with emphasis on their silhouette, engineering form, photographic appearance, and interest appeal. In addition to this manual, large posters of silhouettes or wash-drawings may be used. Silhouettes, wash-drawings, or photographs can also be projected on screens using delineoscopes or film slides or strips. THIRD, the student's attention must thereafter be directed to recognizing the "total form" of the object. For this purpose, motion pictures (on individual airplanes, ships, etc.) and models can be utilized to good advantage. Film slides and film strips projected for progressively decreasing periods of time are the best means of presenting "total form" and *should be utilized to the maximum extent to which these aids are available*. FINALLY, the aircraft, etc., are observed under the most realistic conditions possible, as in the "Quizcraft" series of motion pictures. Where necessary the ingenious recognition instructor should improvise his own aids and equipment. Cases are reported where an opaque projector (i. e. reflectoscope) was concocted from a box, bulbs, old lenses, cardboard tube, etc. In this, as in any other enterprise of war, improvisation will often be the rule and not the exception.

In conclusion, PRACTICAL RESULTS ARE THE FINAL TEST AND A STUDENT MUST TRY HIS SKILL ON EVERY ACTUAL SHIP OR PLANE HE SEES AND ON EVERY PICTURE OF ONE IN A MAGAZINE OR NEWSPAPER.

FRIEND

U.S.A.



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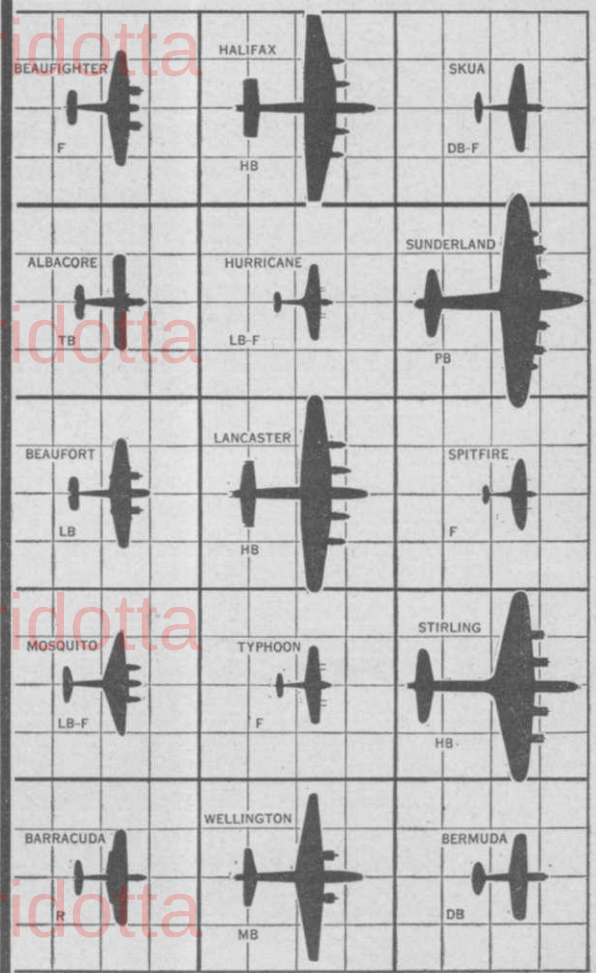
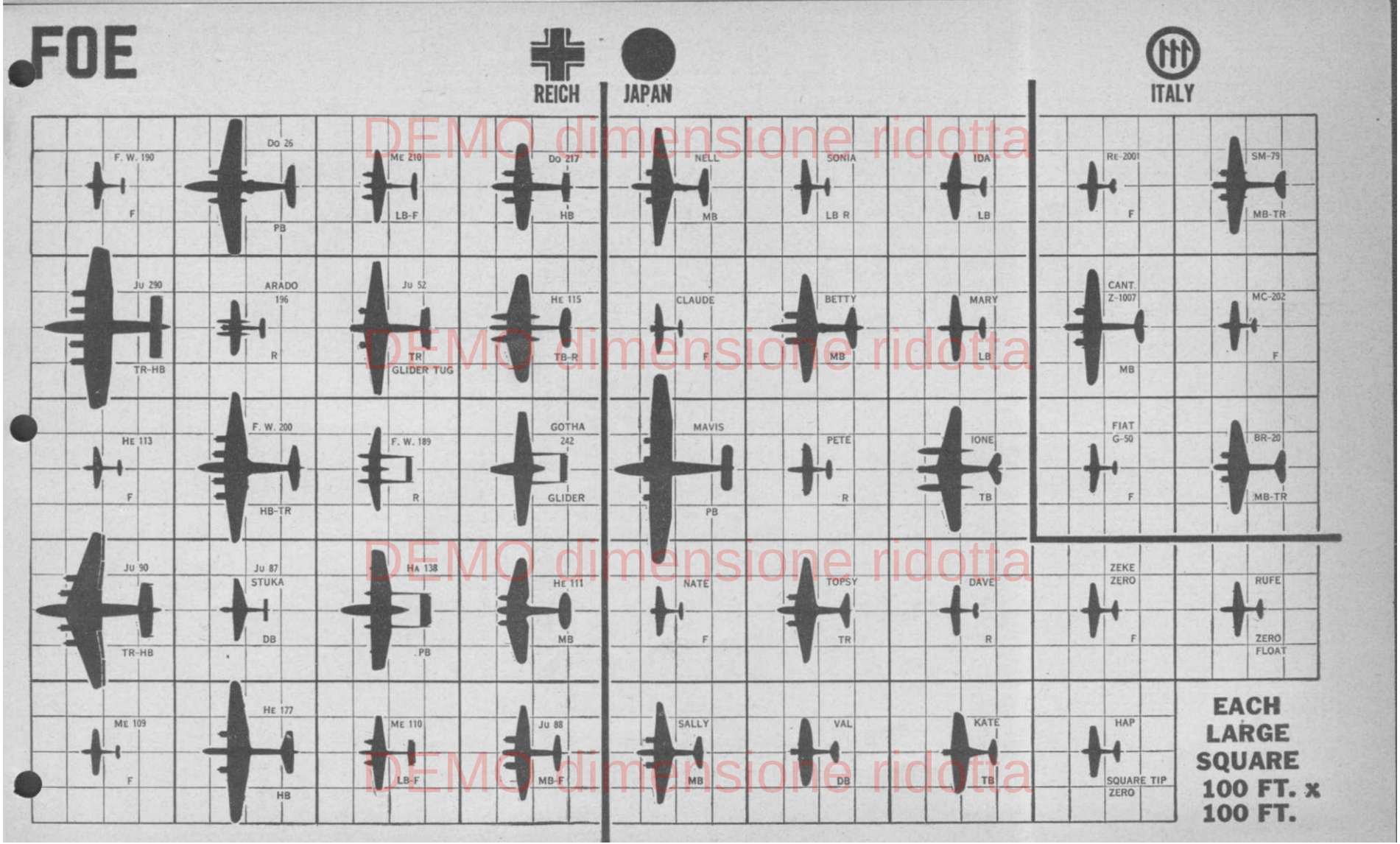


FOE



BRITISH

"Airspeed"	Airspeed, Ltd.
"Armstrong Whitworth"	Sir W. G. Armstrong Whitworth Aircraft, Ltd.
"Blackburn"	The Blackburn Aircraft, Ltd.
"Boulton Paul"	Boulton Paul Aircraft, Ltd.
"Bristol"	The Bristol Aeroplane Co., Ltd.
"De Havilland"	The De Havilland Aircraft Co., Ltd.
"Fairey"	The Fairey Aviation Co., Ltd.
"Folland"	Folland Aircraft, Ltd.
"G. A."	General Aircraft, Ltd.
"Gloster"	The Gloster Aircraft Co., Ltd.
"Handley Page"	Handley Page, Ltd.
"Hawker"	Hawker Aircraft, Ltd.
"Miles"	Phillips and Powis Aircraft, Ltd.
"Percival"	Percival Aircraft, Ltd.
"Avro"	A. V. Roe and Co., Ltd.
"Saro"	Saunders-Roe, Ltd.
"Short"	Short Bros. (Rochester and Bedford) Ltd.
"Supermarine"	Supermarine Aviation Works, Div. of Vickers-Armstrongs, Ltd.
"Vickers"	Vickers-Armstrongs, Ltd.
"Westland"	Westland Aircraft, Ltd.
"Wackett"	Commonwealth Aircraft Corporation Pty., Ltd. (Australia).
"Fleet"	Fleet Aircraft, Ltd. (Canada).
"Noorduyn"	Noorduyn Aviation, Ltd. (Canada).

U. S. S. R.

State aircraft factories, grouped under control of the Central Directorate of Aeronautical Industry (Glavavioprom).

JAPAN

"Aichi"	Aichi Watch and Electric Machinery Co., Ltd.
"Kawanishi"	Kawanishi Aircraft Co., Ltd.
"Kawasaki"	Kawasaki Aircraft Engineering Co., Ltd.
"Mitsubishi"	Mitsubishi Heavy Industries, Ltd.
"Nakajima"	Nakajima Aircraft Co., Ltd.
"Sasebo"	Sasebo Naval Arsenal.

GERMANY

"Arado"	Arado Flugzeugwerke, G. m. b. H. (Arado Aircraft Co., Ltd.).
"Blohm and Voss" (or "Ha")	Blohm und Voss
"Bücker"	Bücker Flugzeugbau, G. m. b. H. (Bücker Aircraft Co., Ltd.).
"Dornier"	Dornier-Werke, G. m. b. H. (Dornier Industries Co., Ltd.).
"Fieseler"	Gerhard Fieseler Werke, G. m. b. H. (Gerhard Fieseler Industries Co., Ltd.).
"Focke-Wulf"	Focke-Wulf Flugzeugbau, G. m. b. H. (Focke-Wulf Aircraft Co., Ltd.).
"Gotha"	Gothaer Waggonfabrik, A. G. (Gotha Vehicle Manufacturing Corp.).
"Heinkel"	Ernst Heinkel Flugzeugwerke, G. m. b. H. (Ernst Heinkel Aircraft Co., Ltd.).
"Henschel"	Henschel Flugzeugwerke, A. G. (Henschel Aircraft Corp.).
"Junkers"	Junkers Flugzeug und Motorenwerke, A. G. (Junkers Aircraft and Engine Corp.).
"Messerschmitt"	Messerschmitt, A. G. (Messerschmitt Corp.).

ITALY

"Breda"	Societa Italiana Ernesto Breda. (Ernest Breda Co. of Italy.)
"Cant"	Cantieri Riuniti dell' Adriatico. (Adriatic United Shipyards.)
"Caproni"	Aeroplani Caproni S. A. (Caproni Airplanes Co., Ltd.).
"Caproni Vizzola"	Caproni Vizzola S. A. (Caproni). (Caproni Vizzola Co., Ltd. (Caproni).)
"Fiat"	Aeronautica d'Italia S. A. (Fiat). (Italian Aircraft Co., Ltd. (Fiat).)
"Macchi"	Aeronautica Macchi S. A. (Macchi Aircraft Co., Ltd.).
"Meridionali"	S. A. Industrie Meccaniche & Aeronautiche Meridionali (Breda). (Southern Manufacturing and Aircraft Co., Ltd. (Breda).)
"Piaggio"	S. A. Piaggio & Co. (Piaggio Co., Ltd.).
"Reggiane"	Officine Meccaniche "Reggiane" S. A. (Caproni). (Reggio Manufacturing Works, Ltd. (Caproni).)
"S. A. I."	Societa Aeronautica Italiana Ing. A. Ambrosini & Co. (A. Ambrosini Aeronautical Engineering Co. of Italy).
"Savoia-Marchetti"	Societa Italiana Aeroplani Idrovolanti "Savoia-Marchetti." ("Savoia-Marchetti" Airplane and Seaplane Co. of Italy.)

ARMY

The designation of Army aircraft is composed of one or two letters designating the class of aircraft, a number indicating the model and a letter to designate the modification of the model. For example the designation B–17F means that the aircraft is a bomber (B), that it is the 17th bomber model accepted by the Army, and that it is the 6th modification of the B–17 model. Unlike U. S. Navy aircraft designations, Army designations give no information as to identity of the manufacturer.

OA	Amphibian
F	Army Reconnaissance (Photographic)
A	Bombardment (Light)
B	Bombardment (Medium and Heavy)
P	Fighter
L	Liaison
O	Observation
AT	Training (Advance)
BT	Training (Basic)
PT	Training (Primary)
C	Transport (Cargo and Personnel)
UC	Utility Transport (Less than 9 places or less than 1,400 lbs. of cargo)
CG	Glider (Troop)
TG	Glider (Training)
CQ	Target (Control)
OQ	Target (Aerial)
PQ	Target (Aerial)

Classifications are prefixed as follows:

R	Restricted Classification (Planes no longer considered as First Line aircraft)
X	Experimental Classification
Y	Service Test Classification
Z	Obsolete Classification

NAVY

The designation of Navy airplanes, airships, and gliders is composed of one or two letters designating the class of aircraft; a number indicating the model; a letter indicating the manufacturer; and a number to designate the modifications of the model. As an example, the first patrol bombing aeroplane to be produced by Consolidated Aircraft would be the PBY–1. The modifications to this aircraft would be the PBY–2, PBY–3, etc. The second patrol bombing aeroplane built by this company would be the PB2Y–1 and successive modifications to this aeroplane would be the PB2Y–2, PB2Y–3, etc. The prefix letter "X" is used for experimental aircraft and gliders.

H	Ambulance
B	Bombing
F	Fighting
O	Observation
P	Patrol
S	Scouting
T	Torpedo
OS	Observation-Scouting
N	Training
R	Transport (multi-engine)
G	Transport (single-engine)
J	Utility
BT	Bombing Torpedo
PB	Patrol-Bombing
SB	Scouting-Bombing
JR	Utility-Transport
L	Glider
ZN	Airship (nonrigid)
SO	Scouting-Observation
SN	Scout-Training
TB	Torpedo-Bombing

NAMES of U. S. Planes

NOTE: NOT ALL THESE ARE REPRESENTED IN THIS MANUAL

	ARMY	NAVY AND MARINE CORPS	NAME	ORIGINAL MANUFACTURER
SCOUTING OBSERVATION (SEAPLANES)	. . . . .	SO3C	Seagull	Curtiss
	. . . . .	OS2U	Kingfisher	Chance Vought
TRANSPORT	C-43	GB	Traveler	Beech
	C-45A	JRB	Voyager	Beech
	C-46	R5C	Commando	Curtiss
	C-47	R4D	Skytrain	Douglas
	C-53		Skytrooper	Douglas
	C-54	R5D	Skymaster	Douglas
	C-60 (C-56, C-57, C-59)	R5O	Lodestar	Lockheed
	C-61	GK	Forwarder	Fairchild
	C-69	. . . . .	Constellation	Lockheed
	C-76	. . . . .	Caravan	Curtiss
	C-87	. . . . .	Liberator Express	Consolidated
	. . . . .	JR2S	Excalibur	Chance Vought
TRAINERS	PT-13 & 17	N2S-1 & 3 . .	Caydet	Boeing
	PT-19 & 23	. . . . .	Cornell	Fairchild
	. . . . .	N2T	Tutor	Timm
	PT-22	NR	Recruit	Ryan
	BT-13 & 15	SNV	Valiant	Vultee
	AT-6	SNJ	Texan	North American
	. . . . .	SNC	Falcon	Curtiss
	AT-7	SNB-2	Navigator	Beech
	AT-8 & 17	. . . . .	Bobcat	Cessna
	AT-10	. . . . .	Wichita	Beech
	AT-11	SNB-1	Kansas	Beech
	AT-13 & 14	. . . . .	Yankee-Doodle	Fairchild
	AT-15	. . . . .	Crewmaker	Boeing
	AT-19	. . . . .	Reliant	Vultee
LIAISON	L-1	. . . . .	Vigilant	Vultee
	L-2	. . . . .	Taylorcraft Grasshopper	Taylorcraft
	L-3C	. . . . .	Aeronca Grasshopper	Aeronca
	L-4B	NE	Piper Grasshopper	Piper
	L-5	. . . . .	Sentinel	Vultee

NOTE: NOT ALL THESE ARE REPRESENTED IN THIS MANUAL

ARMY	NAVY AND MARINE CORPS	NAME	ORIGINAL MANUFACTURER	
B-17		Flying Fortress	Boeing	HEAVY BOMBERS
B-24	PB4Y	Liberator	Consolidated	
B-18		Bolo	Douglas	MEDIUM BOMBERS
B-23		Dragon	Douglas	
B-25	PBJ	Mitchell	North American	
B-26		Marauder	Martin	
B-34	PV	Ventura	Vega	
A-20	BD	Havoc (Attack) Boston (Bomber)	Douglas	LIGHT BOMBERS
A-24	SBD	Dauntless (Dive)	Douglas	
A-25	SB2C	Helldiver (Dive)	Curtiss	
A-29	PBO	Hudson (Patrol)	Lockheed	
A-34	SB2A	Buccaneer (Dive)	Brewster	
A-35, A-31		Vengeance (Dive)	Vultee	
	SB2U	Vindicator (Dive)	Chance Vought	
	TBD	Devastator (Torpedo)	Douglas	
	TBF	Avenger (Torpedo)	Grumman	
OA-10	PBY	Catalina	Consolidated	PATROL BOMBERS (FLYING BOATS)
	PB2Y	Coronado	Consolidated	
	PBM	Mariner	Martin	
P-38		Lightning	Lockheed	FIGHTERS
P-39		Airacobra	Bell	
P-40		Warhawk	Curtiss	
P-43		Lancer	Republic	
P-47		Thunderbolt	Republic	
P-51		Mustang	North American	
	F2A	Buffalo	Brewster	
	F4F	Wildcat	Grumman	
	F4U	Corsair	Chance Vought	
	F6F	Hellcat	Grumman	

CURRENT NAVY MANUFACTURER'S LETTERS

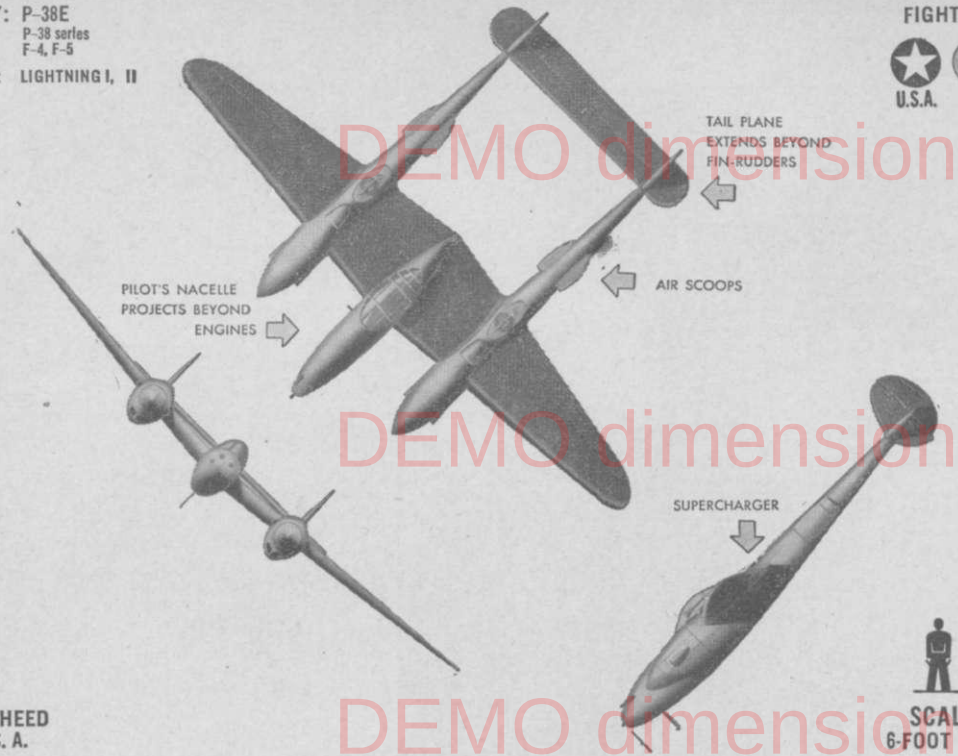
A Brewster Aeronautical Corp.
Allied Aviation Corp.
B Beech Aircraft Co.
Boeing Aircraft Co.
Budd Manufacturing Co.
C Curtiss Airplane Div. (C-W Corp.)
D Douglas Aircraft Co., Inc.
E Bellanca Aircraft Corp.
Gould Aeronautical Corp.
Piper Aircraft Co.
F Grumman Aircraft Eng. Corp.
Columbia Aircraft Corp.
Fairchild Aircraft Corp. (Canada).
G AGA Aviation Corp.
Goodyear Aircraft Corp.
Great Lakes Aircraft Co.
H Howard Aircraft Co.
Hall Aluminum Co.
J North American Aviation.
K Fairchild Aircraft Corp. (U. S.)
Nash-Kelvinator Co.
L Bell Aircraft Corp.
Langley Aviation Corp.
M Glenn L. Martin Co.
General Motors Corp., Eastern Aircraft Division.
N Naval Aircraft Factory
O Lockheed Aircraft Corp.
P Spartan Aircraft Co.
Q Bristol Aeronautical Corp.
R Ryan Aeronautical Co.
Aeronca Aircraft Corp.
S Sikorsky Aircraft
Stearman Aircraft (Division of Boeing Aircraft Co.)
Schweizer Aircraft
T El Segundo Plant (Douglas Aircraft Co.)
Taylorcraft Aviation Corp.
Northrop Aircraft, Inc.
Timm Aircraft Corp.
U Chance Vought Aircraft (Div. United Aircraft Corp.) (formerly Vought-Sikorsky)
V Vultee Aircraft Inc.
Vickers Ltd.
Vega Airplane Co.
W Canadian Car & Foundry.
Waco Aircraft Co.
Y Consolidated Aircraft Corp.

ARMY: P-38E
P-38 series
F-4, F-5

R. A. F.: LIGHTNING I, II

FIGHTER

U.S.A. U.K.



LOCKHEED
U. S. A.

SCALE
6-FOOT MAN

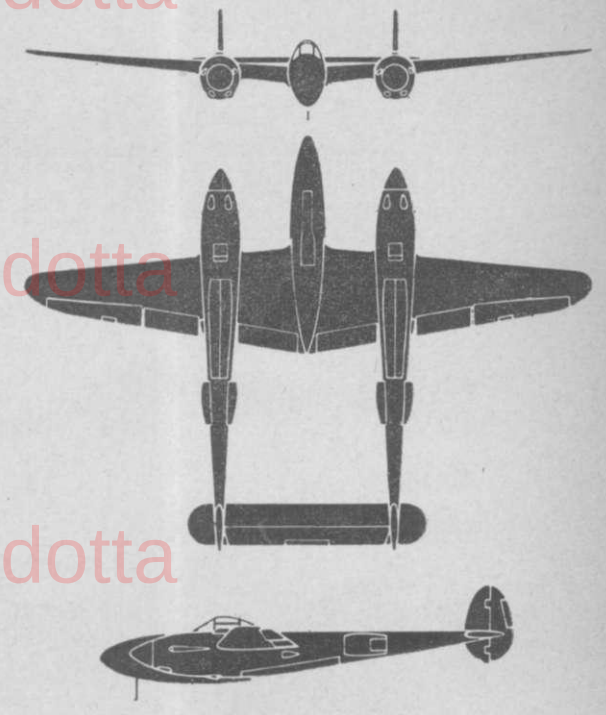
DISTINGUISHING FEATURES: Twin-engine, mid-wing monoplane. Pilot's central nacelle projects well forward to rounded nose. Sharper taper on trailing edge of wings. Full dihedral from the roots. In-line engines mounted in nacelles at forward ends of twin tail booms extending from motors to stabilizer. Air scoops for radiators fitted on sides of booms halfway back. Stabilizer is long and rectangular with rounded tips extending outboard of the booms. Twin fins and rudders are egg-shaped.

INTEREST: In addition to speed, range, and excellent high altitude performance, versatility is an outstanding characteristic of this aircraft. In the Aleutians, in the South Pacific, in Europe and in North Africa, it has been in use both as a low and high altitude fighter and as a photographic reconnaissance aircraft (in latter case, designated as F-4 and F-5). The fact that its propellers rotate in opposite directions, thus balancing torque, enhances maneuverability of the P-38. With its twin tail booms, the Lightning is one of the easiest aircraft to recognize.

APRIL 1943
FROM DATA CURRENTLY AVAILABLE

WAR DEPARTMENT FM 30-30
NAVY DEPARTMENT BUAER 3

P-38 "LIGHTNING"

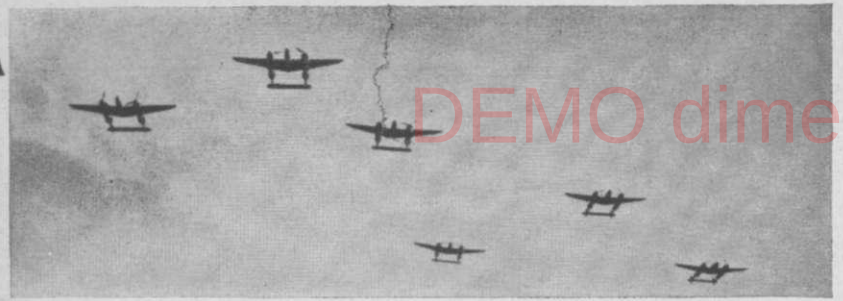


SPAN: 52 ft.
LENGTH: 37 ft. 10 in.
APPROX. MAX. SPEED: over 400 m. p. h.

SERVICE CEILING:
over 30,000 ft.

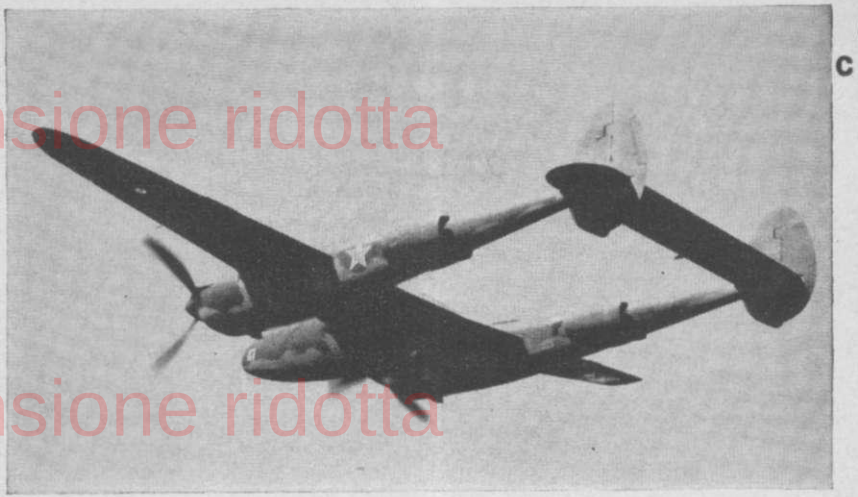
RESTRICTED

A



B

C

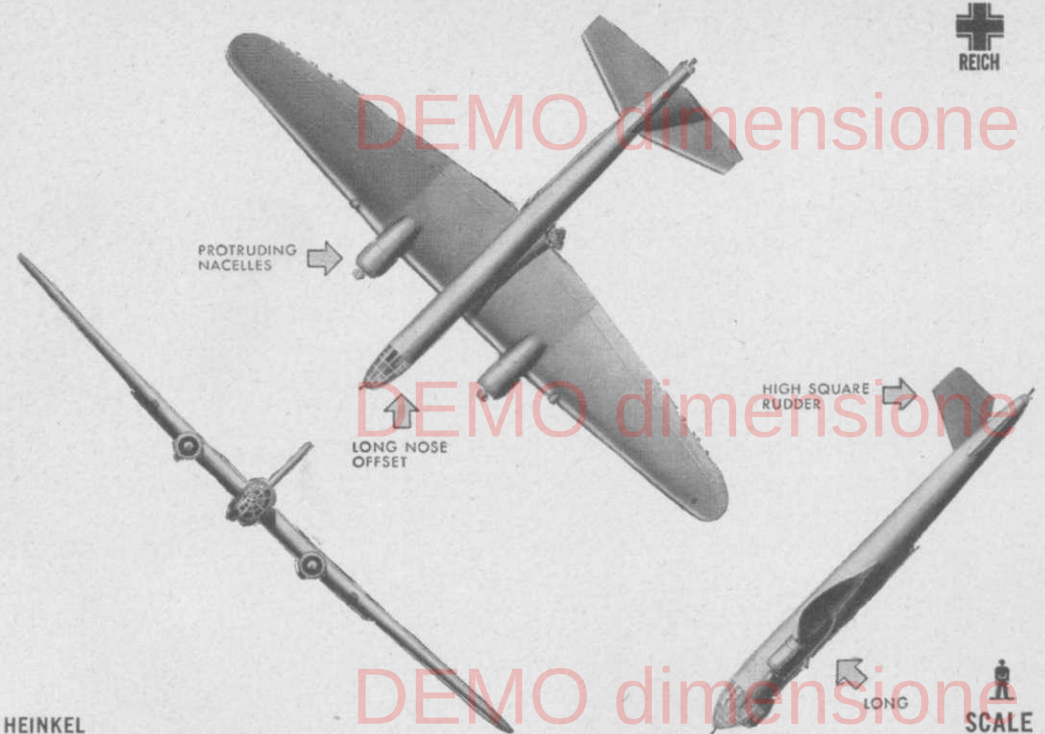


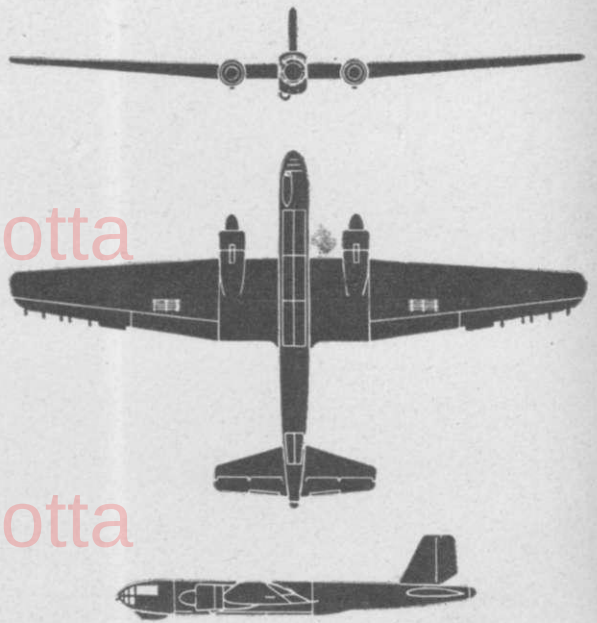
D

HEAVY BOMBER

REICH

HEINKEL "HE. 177"





HEINKEL
GERMANY

SCALE
6-FOOT MAN

DISTINGUISHING FEATURES: Mid-wing monoplane with two radial-type engine nacelles. Wings tapered on outer panels. Long fuselage with rounded nose projecting far beyond engine nacelles. Single fin and rudder, large and angular as also are the stabilizer and elevators.

INTEREST: This aircraft became operational late in 1941. Designed primarily as a long-range "anti-blockade" aircraft, the He 177 may be employed also for short and medium range bombing, dive bombing, mine laying, torpedo dropping, and reconnaissance. A unique feature of this bomber is that each of its two engine nacelles contains really two engines geared to drive a single four blade propeller. The landing gear under each nacelle consists of 2 wheels which apparently retract spanwise and in opposite directions into the wings. Reports refer to a special high altitude version with pressure cabin.

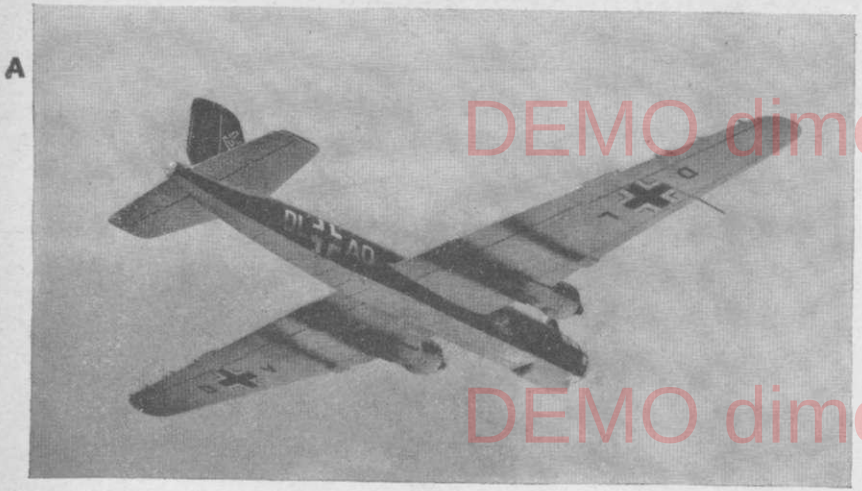
SPAN: approx. 103 ft.
LENGTH: approx. 65 ft.
MAX. SPEED: 300 m. p. h. at 18,000 ft. (est.)
SERVICE CEILING: 23,500 ft.

RESTRICTED

APRIL 1943
FROM DATA CURRENTLY AVAILABLE

WAR DEPARTMENT FM 30-30
NAVY DEPARTMENT BUAER 3

A



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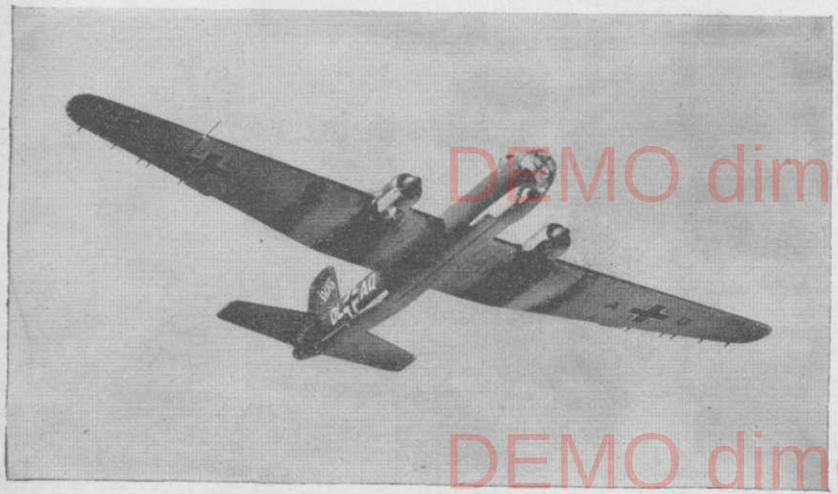

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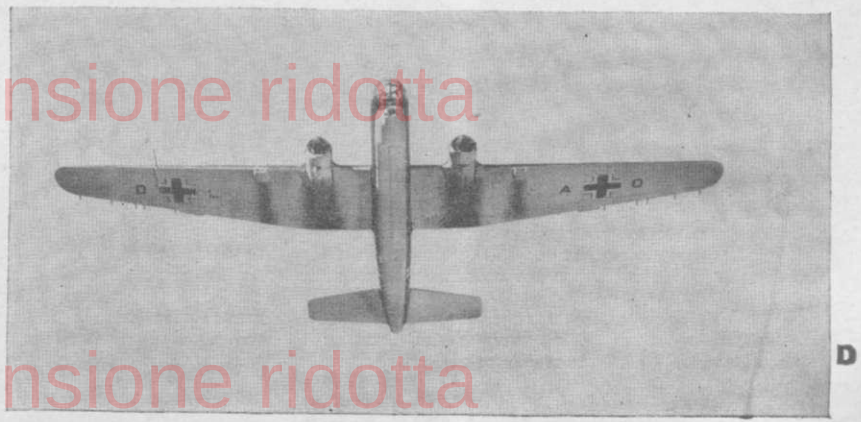
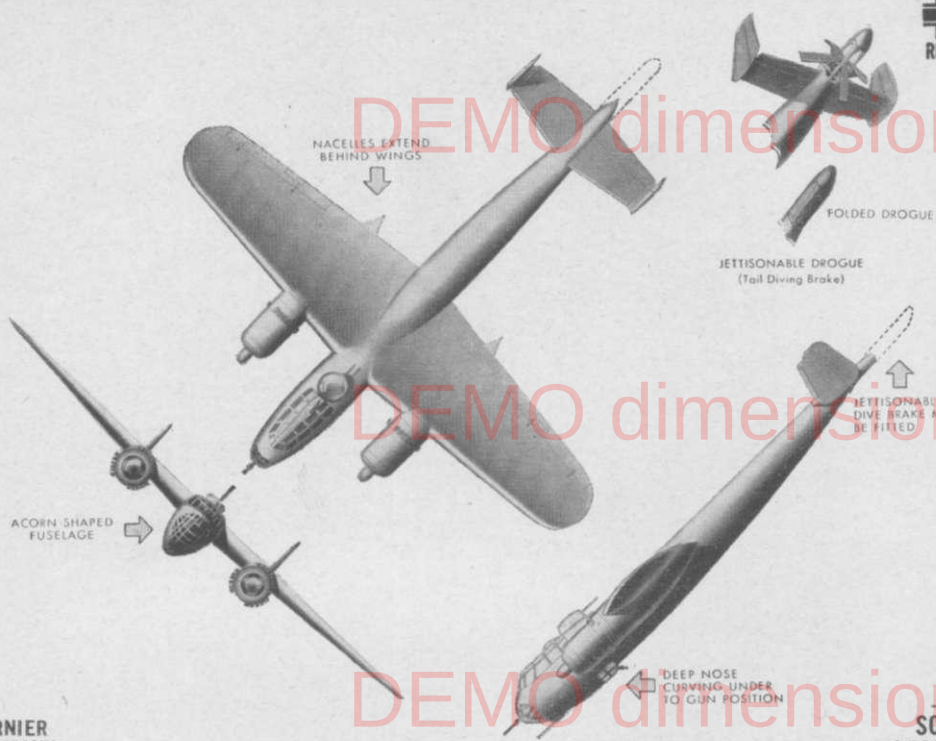


GERMANY: Do. 217 E-2
Do. 217 series

HEAVY BOMBER

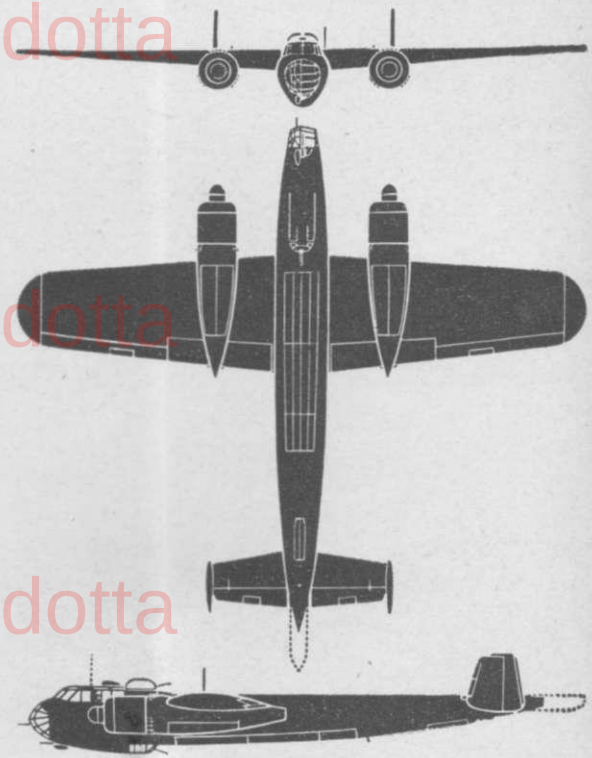
REICH

DORNIER "DO. 217"



SCALE
6-FOOT MAN

DORNIER
GERMANY



DISTINGUISHING FEATURES: Twin-engine, shoulder-wing monoplane. Short tapered wings with round tips. No dihedral. In side view, a long thin fuselage with thick nose. Dorsal turret in rear of cockpit. Twin fins and rudders set outboard of stabilizer.

INTEREST: This aircraft was introduced during the first part of 1942. It is used for level precision bombing and has also been in action as a torpedo bomber against convoys. In addition, this Dornier operates as a dive bomber and for this purpose may carry a novel "umbrella"-type jettisonable diving brake in its tail, used to slow its speed. The Do 217's are very formidable airplanes and it takes the most modern of fighters to deal with them. They are the current Dornier bomber, the older Do 17Z being obsolete. Several modifications differing somewhat in detail are in use.

SPAN: 62 ft. 5 in.
LENGTH: 56 ft. 6 in.

SERVICE CEILING:
29,000 ft.
(with normal load, 22,500 ft.)

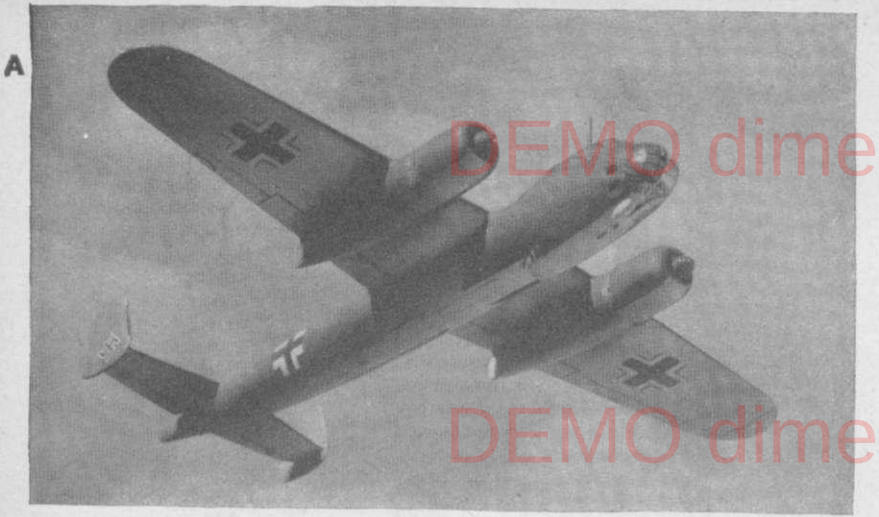
APPROX. SPEED: 325 m. p. h. at 17,000 ft.

APRIL 1943
FROM DATA CURRENTLY AVAILABLE

WAR DEPARTMENT FM 30-30
NAVY DEPARTMENT BUAER 3

RESTRICTED

A



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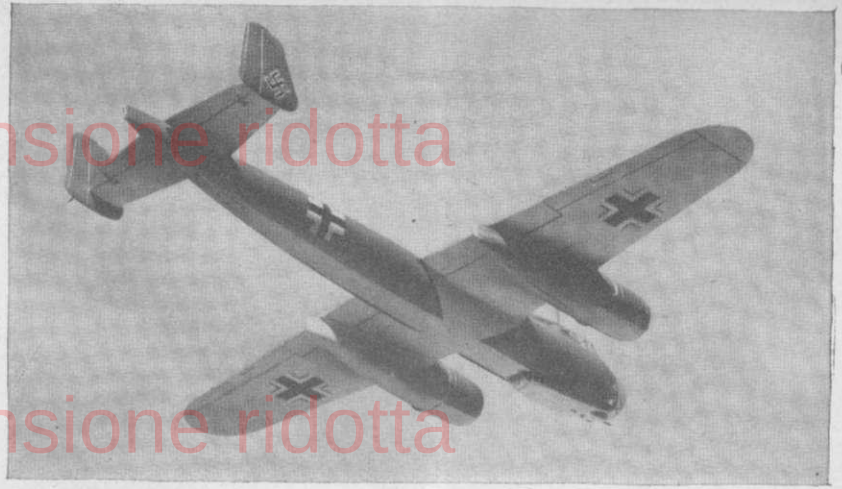

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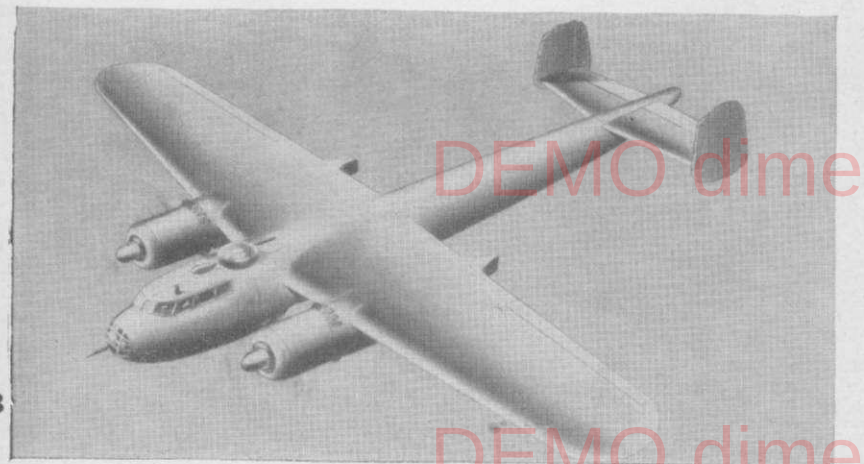

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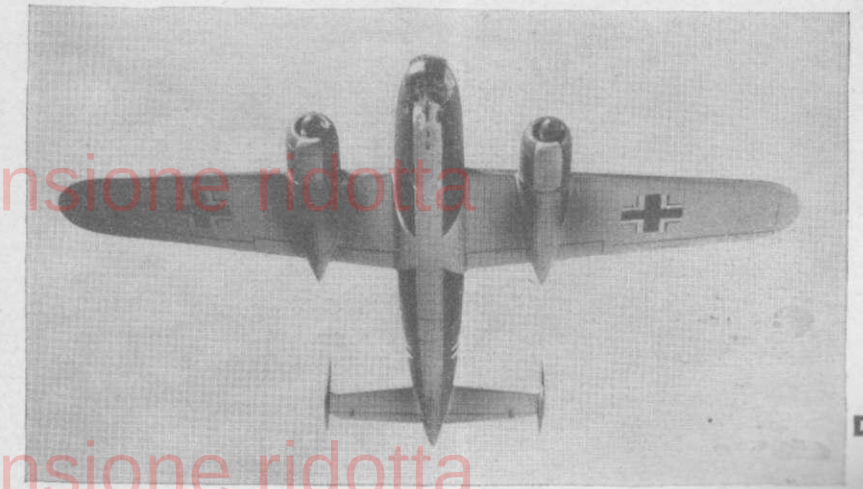

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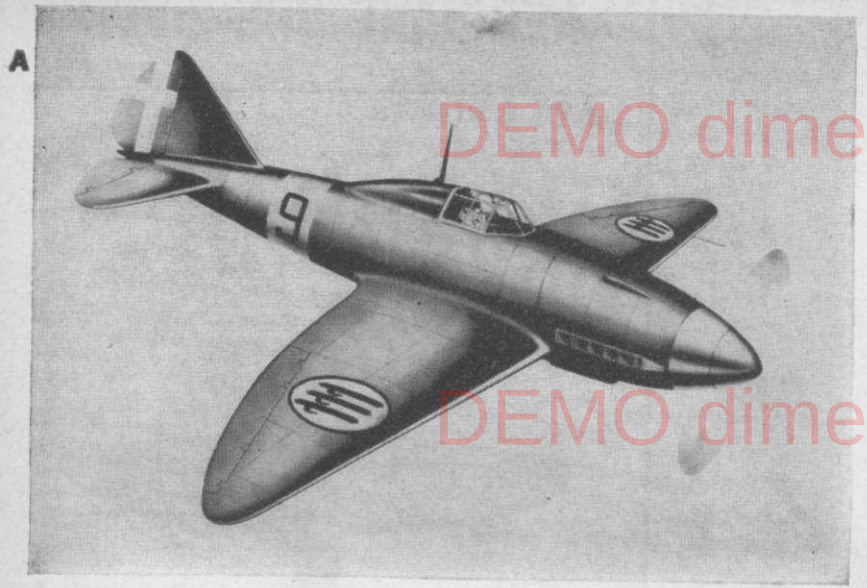


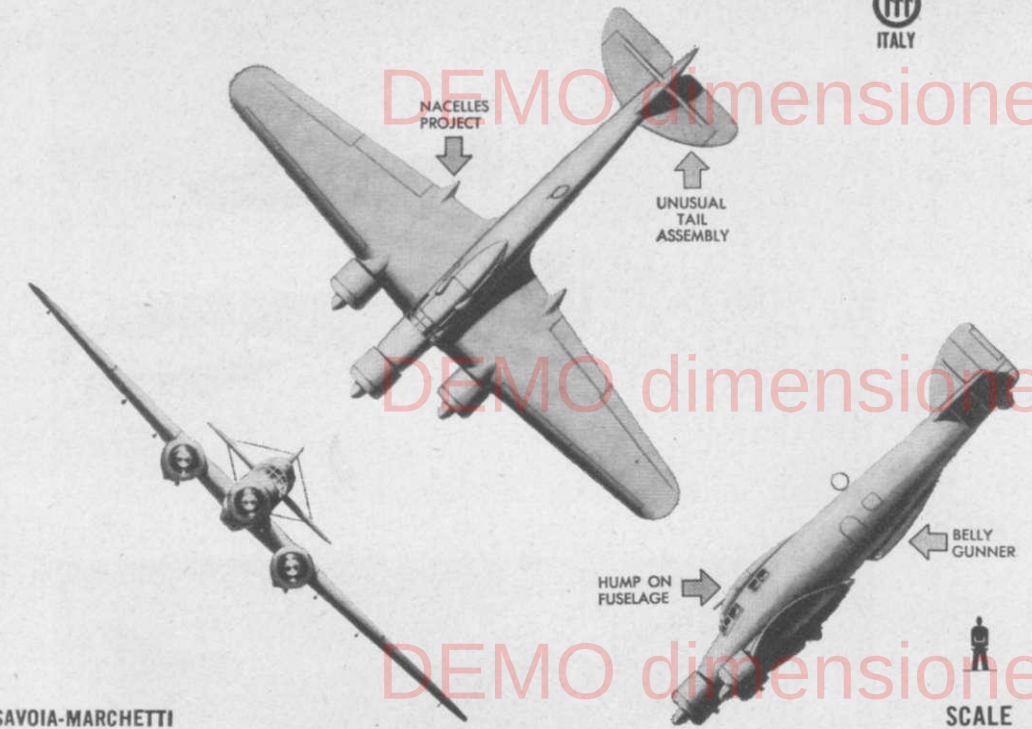
C

B

D

MEDIUM BOMBER—TRANSPORT

ITALY



SAVOIA-MARCHETTI
ITALY

SCALE
6-FOOT MAN

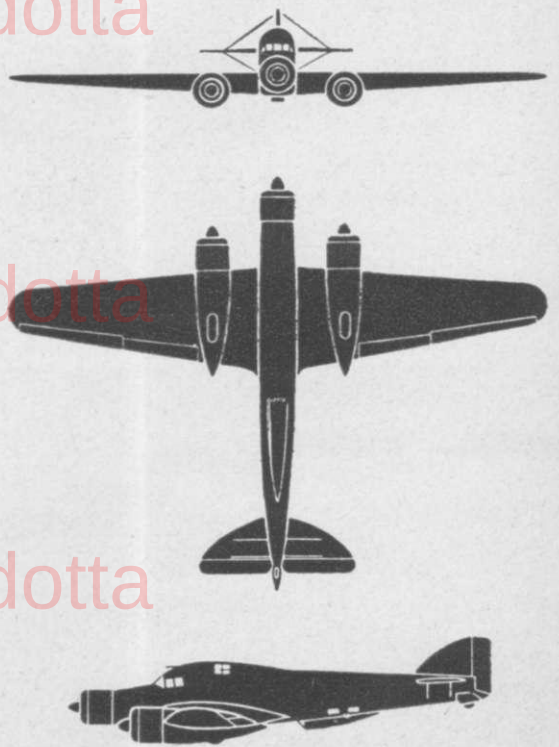
DISTINGUISHING FEATURES: Three-engine, low-wing monoplane. Tapered wings with more pronounced taper on trailing edge. Fuselage is humped at cockpit and tapers backward toward a low fin. Large radial motors. Ventral gondola visible. Rudder has straight trailing edge.

INTEREST: This is Italy's standard long-range bomber and Mussolini has more squadrons of this type than of any other bomber. It has served in Spain, and has been very extensively used in Africa, Albania, and over the Mediterranean. It has been used for torpedo attacks and it is interesting to note that the Allies consider Italian Torpedo Squadrons to be the most efficient in the Italian Air Force. Their torpedoes are believed to be superior to those of the Germans.

APRIL 1943
FROM DATA CURRENTLY AVAILABLE

WAR DEPARTMENT FM 30-30
NAVY DEPARTMENT BUAER 3

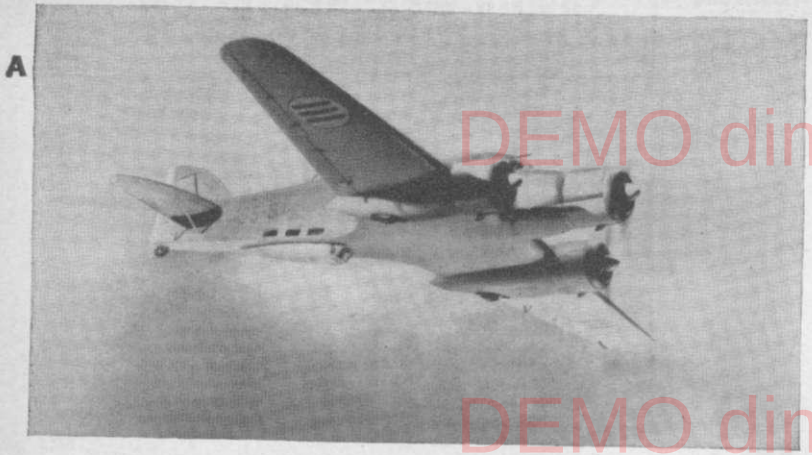
SAVOIA-MARCHETTI "SM-79"



SPAN: 69 ft. 6 in.
LENGTH: 54 ft. 6 in.
SERVICE CEILING: 23,000 ft. (normal load)
MAX. EMERGENCY SPEED: 255 m. p. h. at 12,500 ft.

RESTRICTED

A



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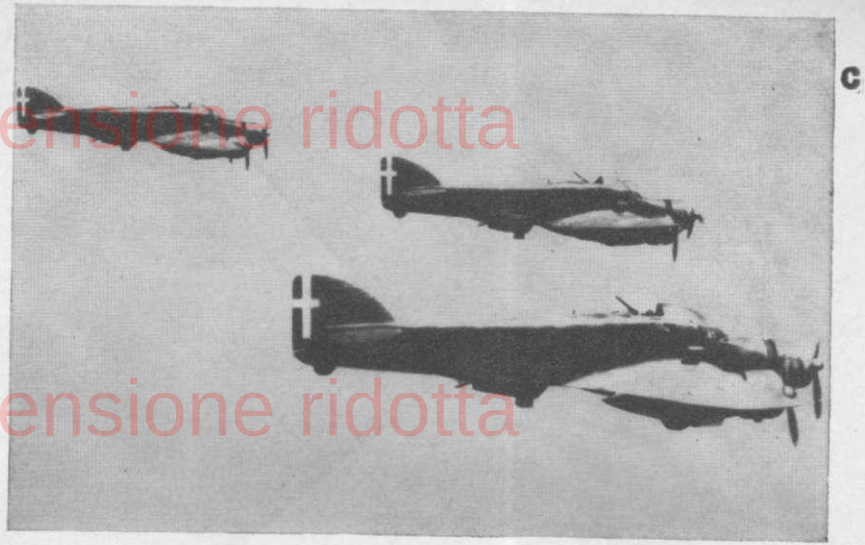

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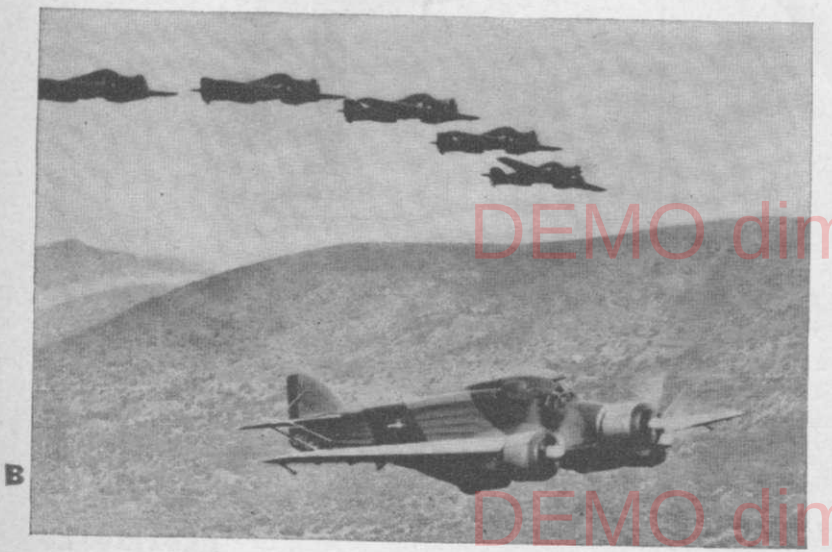

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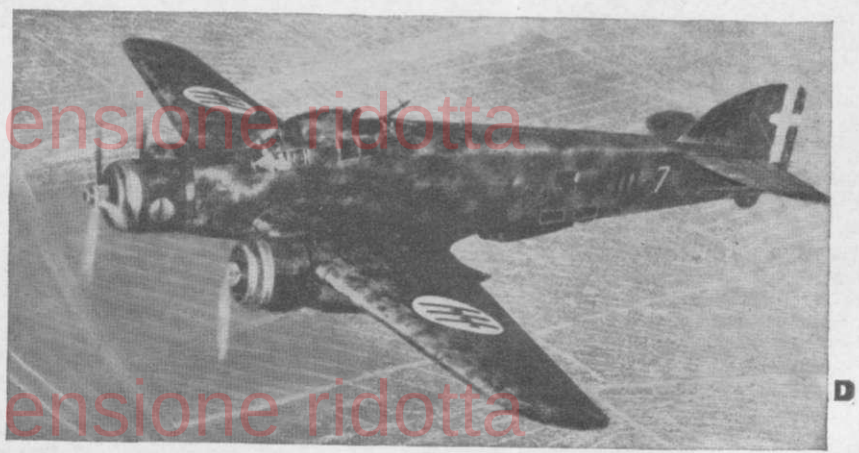
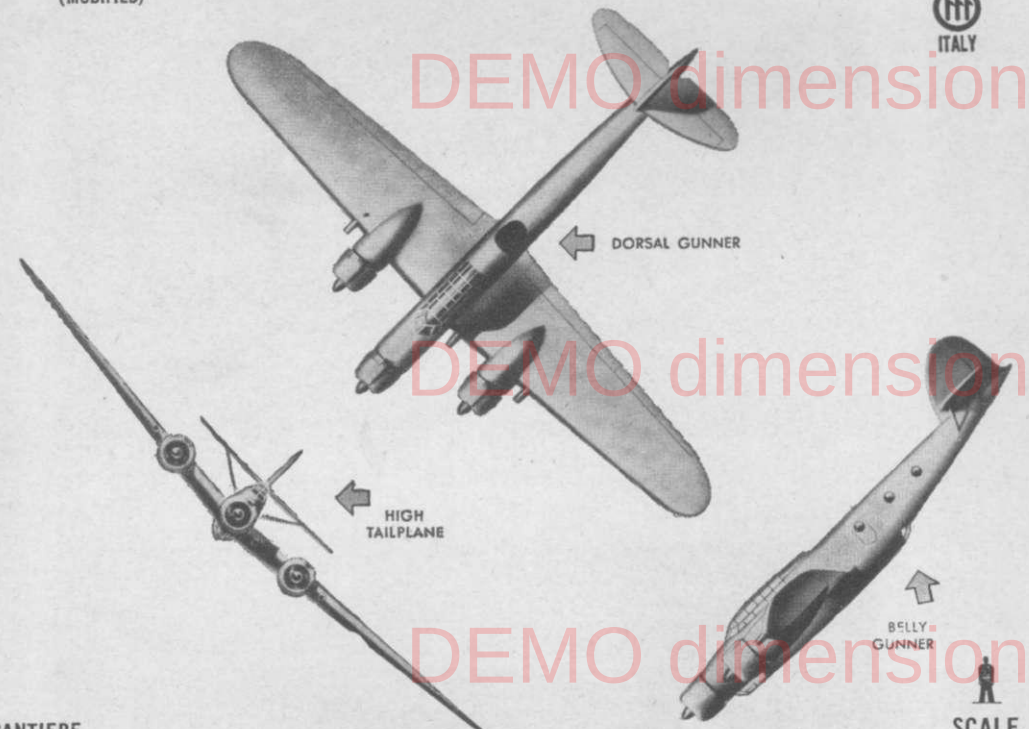


ITALY: CANT. Z-1007 bis
Cant. Z-1007 bis
(MODIFIED)

MEDIUM BOMBER

ITALY



CANTIERE
ITALY

SCALE
6-FOOT MAN

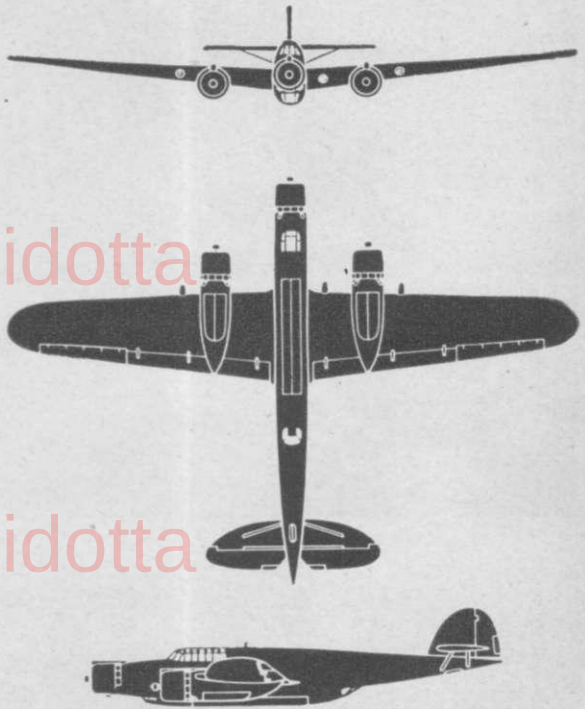
DISTINGUISHING FEATURES: Low-wing monoplane with three (3) radial engines. Wings have moderate taper and dihedral. Deep fuselage with raised cabin and bulging bomb aimer's position, bomb bay, and rear ventral gun position. Large curved fin and rudder. Strut braced, elliptical stabilizer and elevator. Later modified version has unbraced twin fins and rudders placed outboard (Photo C).

INTEREST: The "Alcione" ("Kingfisher"), as this airplane is called, is one of Italy's best bombers and has been used in every theater of operations in which Italian planes appear. It is constructed of nonstrategic materials such as wood and plywood skin. Its wings are made of plywood, covered with fabric. It will, in all probability, replace the older SM 79. It is believed that it may carry a torpedo stowed internally.

APRIL 1943
FROM DATA CURRENTLY AVAILABLE

WAR DEPARTMENT FM 30-30
NAVY DEPARTMENT BUAER 3

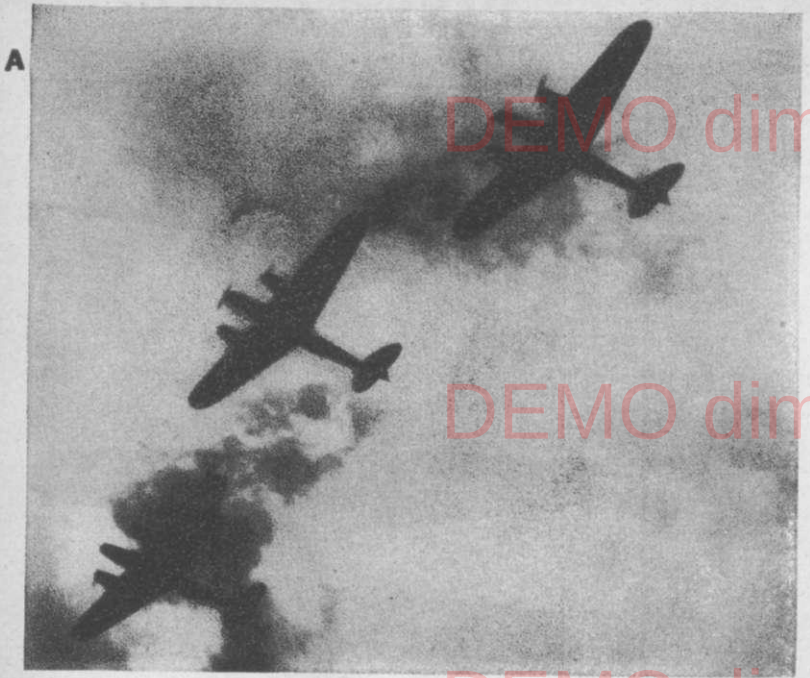
CANT. "Z-1007"



SPAN: 81 ft. 10 in.
LENGTH: 61 ft. 3 in.
MAX. EMERGENCY SPEED: 280 m. p. h. at 15,000 ft.
SERVICE CEILING: 26,500 ft. (normal load)

RESTRICTED

A



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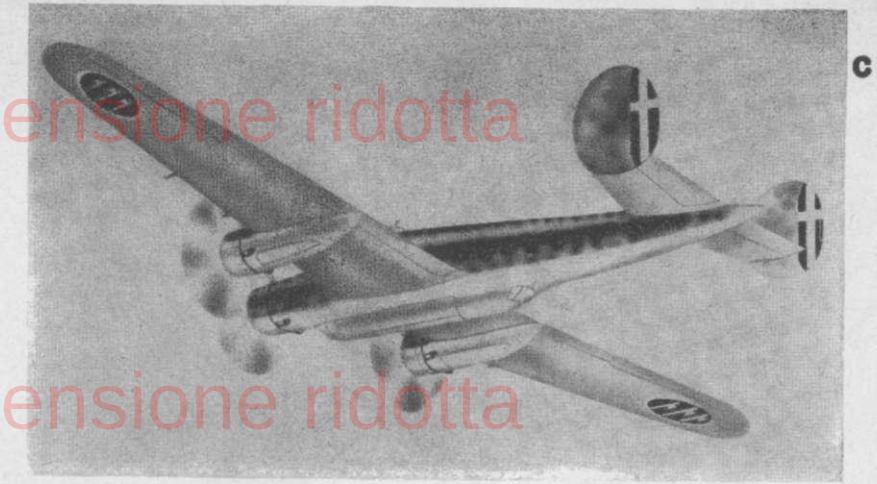

B

D