

AERONAUTICS—PSYCHOLOGY

How To Spot Airplanes

Official Silhouettes Showing German, Japanese, British And American Planes Will Aid in Distinguishing Them

By MARJORIE VAN DE WATER

THOUSANDS of lives may depend, some day, on your being able to spot airplanes in the distant sky and know friend from foe.

It is not too soon to train yourself now to tell bomber from training plane, scouting plane from airliner. U. S. or British plane from German and Japanese.

Aviation-minded America nevertheless still finds it difficult to know one airplane from another when they are flying at high altitudes and are viewed from the ground.

The secret lies in a training course in observation which you can give yourself, following these hints of psychologists:

1. Watch airplanes constantly under all sorts of conditions. Go to an airport if you can and watch the airliners taking off. Watch them as they fade into the distant sky. Notice what details fade from sight first, which are visible longest. Wear dark glasses, or polaroid glasses if you can, to shield your eyes from the painful glare of the sun.

2. Watch airplanes at night and in the dusk of early evening and dawn.

3. Few people are able to memorize the entire looks of a plane as you would a friend's face, or to distinguish one plane from a closely similar model in this way. Instead, look for details of construction. I will list a few of these for you in this article. You can add to the list yourself.

Make It a Game

4. Start games with other airplane identification fans. Play them as tourists play automobile poker. Allow ten points for each of the distinguishing features listed below. The player first noting wing location, tail features, number of motors, and so on adds ten points to his score.

5. In England little groups of airplane spotters are getting together in clubs to follow this field as a new fascinating hobby. That the ability of every man, woman and child in England to be able to tell friendly airplane from foe is extremely important to the safety of the whole nation adds a particular thrill to the sport of this new skill. Here is a new

field for your own local Science Club or Aviation Club.

6. Study silhouettes. The view you get of an airplane when you see it against the back-drop of a bright sky is not at all like what you see when the plane is on the ground and the sun shining down on it from above. For that reason the black silhouettes which nevertheless give a three-dimensional effect are particularly helpful in learning to spot planes in flight. They are better for this purpose than photographs which show numbers, insignia, and so on seldom distinguishable in the air. They are also better than another type of silhouette commonly used which has a flat, paperdoll effect. Get hold of all the silhouettes you can for study. A book of British, German and American silhouettes is available in handy pocket size for you to take along on field trips. It is "Aircraft Recognition," a Penguin Book by R. A. Saviile-Sneath. Another will be published soon containing Japanese silhouettes, and the latest American and German models. Watch newspaper pictures and movies.

Here are some of the features for you to look for in studying the silhouettes and airplanes.

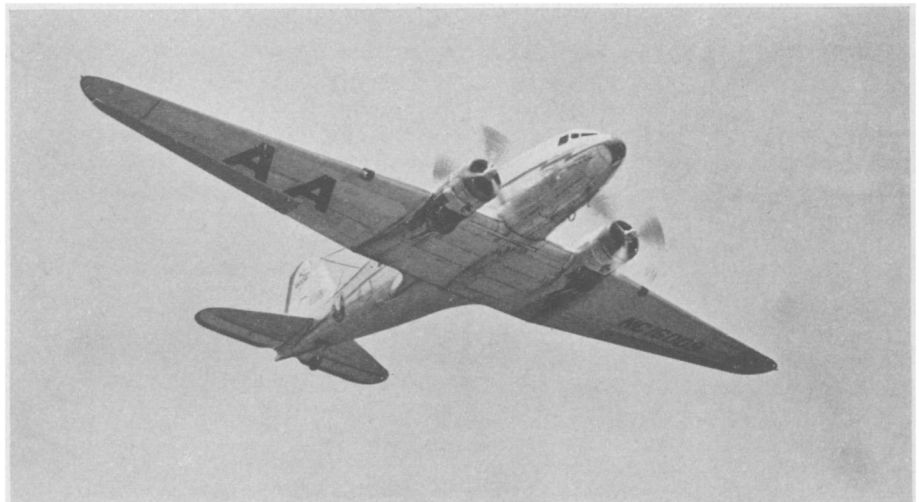
Number of wings. By far the largest

number of airplanes you are likely to see are single-wing, or monoplanes. If you observe, therefore, that a particular plane is a biplane, you have immensely simplified identification. The Japanese use a biplane as a dive bomber similar to the British "Albacore" which has taken part in many raids on invasion ports and coastal airdromes. Both can presumably be used from aircraft carriers. Most obvious differences between friend and foe in this case are: glassed in cockpits on "Albacore"; distance that the fuselage projects forward of wings on "Albacore"; and relatively stubby fuselage of Jap plane. British plane has "trousered" legs but wheels without spats. The Japanese dive bomber has spats but no trousers. These terms refer to coverings for streamlining.

Land or water? One of the easiest observations to make on a distant plane is probably to determine whether it is a flying boat, seaplane with floats or pontoons, or whether it is a land plane.

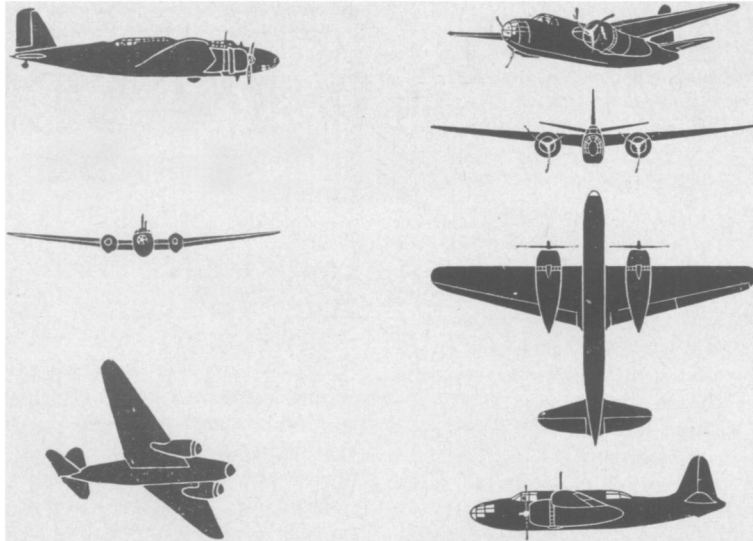
Number of motors. Three- and four-motor planes are relatively uncommon. Note these or whether a single motor or twin-motor job.

Type of motor. A stream-lined effect on the motor generally means a liquid-cooled engine. The radial motor has a snub-nosed appearance. Modern designs, however, include exceptions to this general rule.



YOU KNOW THIS ONE

Most familiar in the air over the United States is this air liner, the Douglas D.C. 3. Compare this photograph with the silhouettes of similar airplanes shown on the facing page.



MODIFICATIONS

The silhouettes at the left are of the Japanese heavy bomber 97, which is probably a militarized copy of the D.C. 3 shown on the facing page. Our own Douglas "Boston" (right) is made by the same company as the D.C. 3, but is the militarized version of the D.C. 5. Note the engine nacelles projecting back of the wings, underslung motors, shoulder position of the wings and very marked dihedral of the tail plane. These features distinguish it from the other two twin-engine planes. All the silhouettes of Japanese planes used with this article are official photographs of the U. S. Army Air Corps. Those of the "Boston" are from R. A. Saville-Sneath's book "Aircraft Recognition" (Penguin Books).

Shape of wing. Wing shape can be seen in the straight overhead view and in the "plan" view of the silhouettes. Notice whether the wing has little or no taper, moderate taper, or full taper; whether taper is on leading edge only, trailing edge only, both edges, or whether wings are elliptical. Notice also the tips of the wings — whether rounded, pointed, or square cut.

Position of wing. In a monoplane, the height of the wings with reference to the fuselage is important for identification. In the parasol high-wing type, the wing is well above the body and is attached to it by struts. The shoulder high-wing type has wings attached at the "shoulder" of the fuselage. The Japanese flying boat is of parasol high-wing type. All others shown are of the low-wing or midwing type, in which the wings are attached to fuselage in the positions indicated by the names.

Wing dihedral. The head-on or tail view of a plane or silhouette shows the tilt, the angle at which the wings are attached to the fuselage, known as the dihedral. With little or no dihedral, the wings form a flat or straight line. Other classifications are moderate dihedral, in which the wings tilt upward like the raised wings of a bird in flight. Some-

times a plane has a combination of no dihedral in the center section with full dihedral only in the extreme outer section near the wing tips.

The gull wing has full dihedral in the center section with no dihedral in the rest of the wings. The inverted gull wing has "anhedral," or a droop, in the center section and then an upward lift in the outer sections of the wings.

Wing span and aspect ratio. The length of the wings and the proportion of length to width are very difficult to observe from the ground.

Tail. The tail is, in airplane spotting, what the radiator is in automobile identification. On a European plane, it is almost like the designer's signature, so distinctive is the work of each maker. Note first whether the tail is simple, with single fin and rudder, or compound with twin fins and rudders. In the compound unit, note the position of fin and rudder on the tailplane. Are they above it, below it, or midway? How far out from the fuselage? You will notice, that with a few exceptions, compound tail units occur on planes with more than one motor.

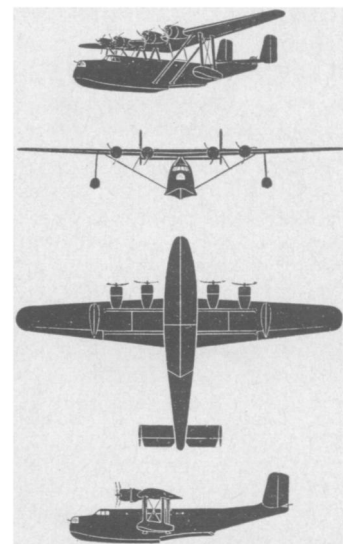
Identification of German planes is much easier than is telling Japanese planes from either German models or American planes. This is because so many Japanese

airplanes are frank copies of well-known German designs and our own. There is also the possibility that the Japanese are actually using German airplanes and the American planes bought from us during 1938 and 1939. These could easily be converted for war use.

If you are on the West Coast, therefore, train yourself to notice all the small details you can possibly detect in flight with a view to distinguishing between, say, the Douglas D.C. 2 or D.C. 3, familiar air liners, and a clever copy or adaptation of this type.

If you are on the East coast, strain your eyes for a flying boat of this description: Monoplane with high wing, braced. No wheels or floats—a boat. Two in-line engines, but easily mistaken for a single engine boat because motors are mounted in tandem. Uniformly tapered wings with rounded tips, have no dihedral. Simple tail. Unusual distinguishing characteristics are the lateral sponsons, or stub wings, built into the hull to serve as water stabilizers in place of wing floats.

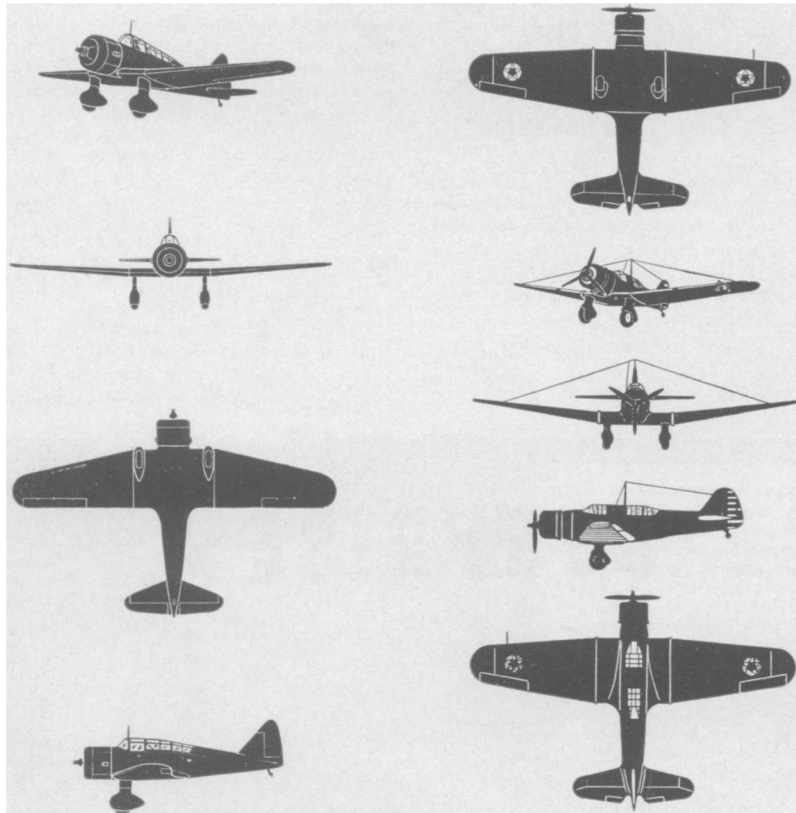
If the East Coast is ever attacked by a German bomber, it may very well be by a military version of this Dornier 18, which made the first crossing of the North Atlantic ever made by a regular passenger flying boat. It was (*Turn to page 76*)



MODERN JAP BOAT

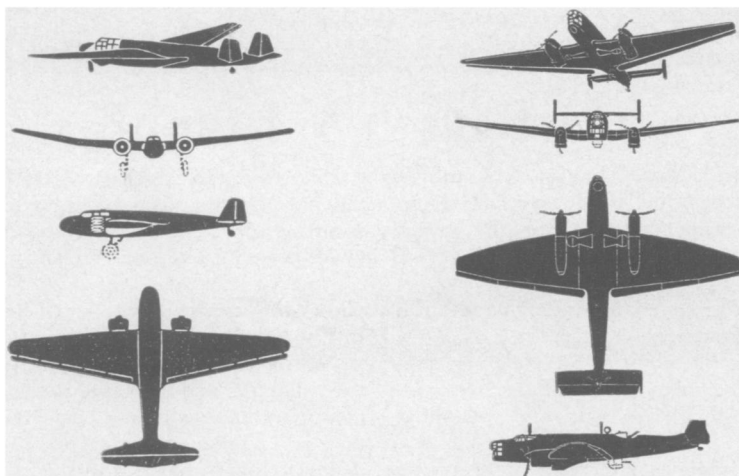
This Japanese flying boat "Type 97" is a four-motor high-wing monoplane designed in 1937. In many ways it looks like the flying boats built in America by Consolidated. Note, however, the wing floats which distinguish it from Consolidated's long-distance bomber the "Catalina" and also from the German Dornier Do 18.

The very high tail is also distinctive.



FLYING IN FAR EAST

The silhouettes at the left show the Japanese "Karigane" which means wild goose, their Type 98. This low-wing monoplane with the single rotary engine is, according to British sources, the Japanese edition of the U. S. Northrop A.17, official U. S. Army Air Corps silhouettes of which are shown at the right. Note the greater taper of the wings on the Japanese plane and the much greater dihedral on the American. The tails differ in shape conspicuously.



TWIN TAILS

Here is a long twin-tail Japanese monoplane (left) which is all too familiar to the Allies in the Far East shown beside the German Junkers 86 from which it is said to be copied. Can you pick out the differences? Note particularly the position of the fins, widely spaced, at the very extremes of the rudder on the German model. Note also the German's taper of the fuselage.

● RADIO

Saturday, February 7, 1:30 p.m., EST

On "Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. William D. Coolidge, vice president and director of research of the General Electric Company and member of the National Inventors Council, will discuss the way inventions can aid in the war.

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Tuesday, February 3, 10:15 p.m., EST

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then catapult launched from the mother ship "Schwabensland" at its only stop for refueling. Or it might be the four-engine Blohm and Voss, which made more than 100 Atlantic crossings just before the war. This seaplane is easily distinguished by its inverted gull wing and unusual elevated twin tail with a single flipper.

Science News Letter, January 31, 1942

POPULATION

Allies' Fighting-Age Men Outnumber Axis' 2 to 1

THE United States and its Allies have a two-to-one chance of victory on the basis of manpower, according to an estimate of war-age males in the principal nations at war, by the U. S. Bureau of the Census.

By making fighters of all males between the ages of 18 and 35, the principal belligerents would be able to put 85,203,000 men in the field, not including China, India and the Netherlands Indies. Of this grand total, the Bureau states, 56,643,000 would serve under Allied flags, and 28,560,000 under Axis flags.

Science News Letter, January 31, 1942

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