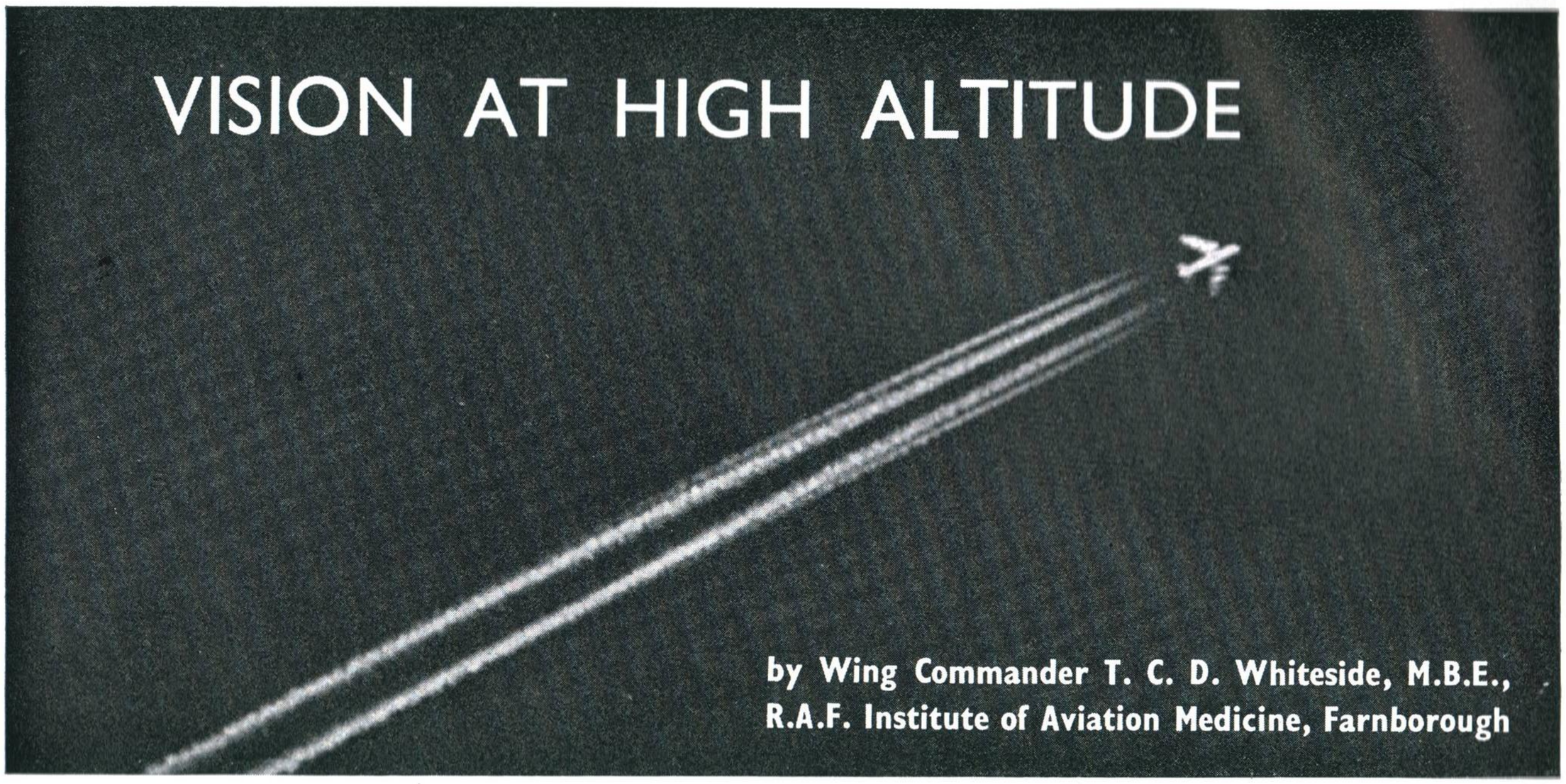
JOINT SERVICES

RECOGNITION *Journal*



Vol. 20 MAY 1965 No. 5

VISION AT HIGH ALTITUDE



by Wing Commander T. C. D. Whiteside, M.B.E.,
R.A.F. Institute of Aviation Medicine, Farnborough

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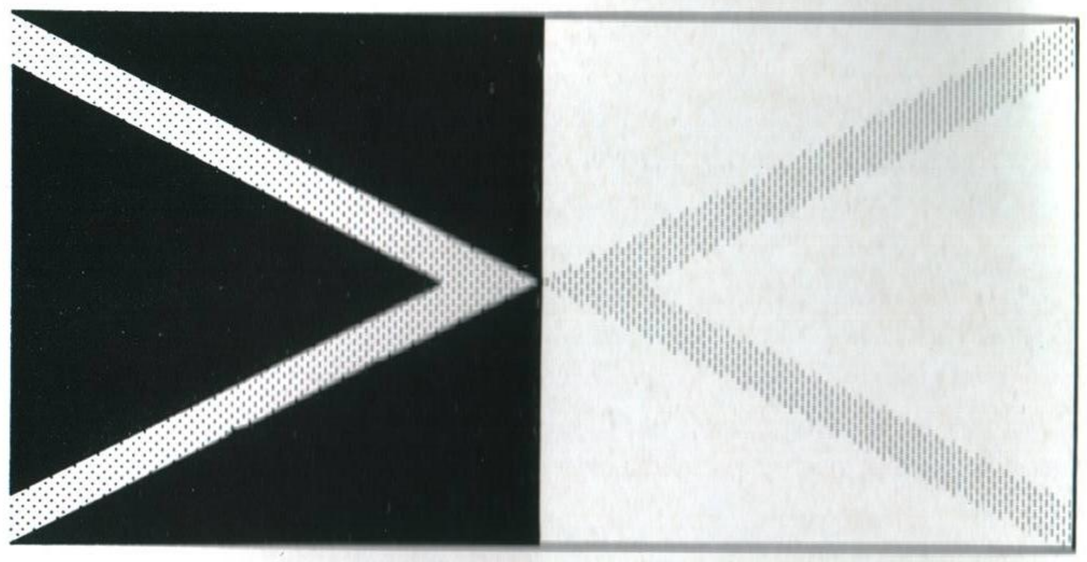
It is fairly true to say that the problems of vision in flight at high altitudes which are related neither to decompression of the pilot nor to the speed of the aircraft or effects of acceleration are caused by the environment—an environment which differs so markedly from that encountered at lower altitudes that the visual system, although admirably suited for a purely terrestrial existence, becomes unable to function satisfactorily.

The change in the environment which gives rise to difficulties in seeing is due simply to the fact that at high altitude one has partly traversed the earth's atmosphere.

Since the brightness of the sky is caused by the scattering of light by atmospheric particles, the atmosphere appears as a bright layer above the earth. At any height in this layer, the sky brightness is proportional to the atmospheric pressure, so it is obvious that in a cloudless sky, the difference in brightness between say, 20,000 feet and 30,000 feet will be much greater than the difference in brightness between 60,000 feet and 70,000 feet. Equal increases in altitude are therefore accompanied by progressively smaller changes in sky brightness. Indeed, as was predicted earlier, and as we now know as a result of direct observation by the astronauts, our planet seems to be surrounded by a bright envelope of atmosphere whose luminance is greatest near the surface of the earth.

In any flight over 20,000 feet one has, therefore, traversed most of this envelope of bright atmosphere so that most of the light comes from below instead of from above. At 40,000 feet, for example, one has already traversed four-fifths of this atmosphere, so that the reversal in light distribution is even more marked. Our eyebrows and the recession of the eyes beneath the brow enable us to cope with glare coming from above, but this unnatural reversal allows light to flood into the eye unhindered, and consequently we experience glare more readily when it is coming, as in this case, from below eye level. This is one of the most obvious and most familiar causes of visual discomfort in flight at high altitude.

As a result of this excessive light flooding into the eyes from below eye level, there is the familiar problem of difficulty in reading an instrument panel, particularly if it is in shadow. Some of the reasons for this difficulty are purely physical in the sense that the instrument panel in shadow may receive less light than it would at lower altitude and is, therefore, darker, but there are also physiological effects which increase this difficulty in seeing since the high brightness outside makes the already dark instrument panel appear even darker. The same effect is seen in the accompanying figure of a well-known illusion describing this phenomenon of "simultaneous contrast". The two "Vs" shown are of equal greyness:



If the eyes are shielded from this glare source, which comes from the cloud floor or generally from below even when there is no cloud, there is an almost immediate improvement in visibility, and it was towards this end that the Mark 1 visor was originally designed so that one could look outside through the transparency whilst having an uninterrupted view of the instruments below the lower edge of the visor.

A second problem associated with the type of sky encountered frequently at high altitude is that of accommodation or focusing of the eyes, which has been referred to in the past as "space myopia" or "empty field myopia". This is however

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JOINT SERVICES

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CONTENTS

Feature	Page
Dominie (*cover*)	113
Vision at High Altitude, by Wing Commander T. C. D. Whiteside, M.B.E. (*editorial*)	114
* Sea King	116
* Hare	118
Cessna 180	121
* Belfast	122
* Cessna T-37	124
Testing Time	126
Briefs	127
* Riga Class (U.S.S.R.)	128
* Aircraft in Profile	131
* Try this for Size!	132
* U.S. M114	134
In Passing	139
Solutions to Tests and Exercises	140

* *Identification Lessons*

not a true "myopia" or permanent shortsightedness. The expression was meant to describe the difficulty which a normal sighted person experiences when he is trying to look at optical infinity in a visual field in which there is no visible detail, for example, the cloudless sky of high altitude. Here is a pilot searching such an empty visual field. He is trying to detect an aircraft which he knows to be some 10 or 15 miles ahead of him. He sees nothing. He keeps looking for this approaching aircraft and suddenly he sees it appearing "out of the blue" at maybe 2 or 3 miles. This is an experience which most aviators have had, although some observe it less frequently than others, but it is a perfectly normal response under the circumstances for the following reasons.

When we look at something and try to bring it to a clear focus, we do so by adjusting the focus of the eye, within about one-fifth of a second, by a process of trial and error, so as to make the image as clear and sharp as we require. Thus, for example, a rapid glance at a clock face may tell us that it is approximately 20 minutes past 12 although we have not focused accurately on the numerals nor on the hands of the clock, but if we wish to know more precisely what the exact time is, then we have to spend somewhat longer in focusing so as to allow the eye to make as sharp and clear a picture as it can by bringing the image formed on the retina at the back of the eye to as high a definition as possible. We can then not only see the actual markings of the minutes round the clock face but maybe also the second hand, and from this we derive our more precise information.

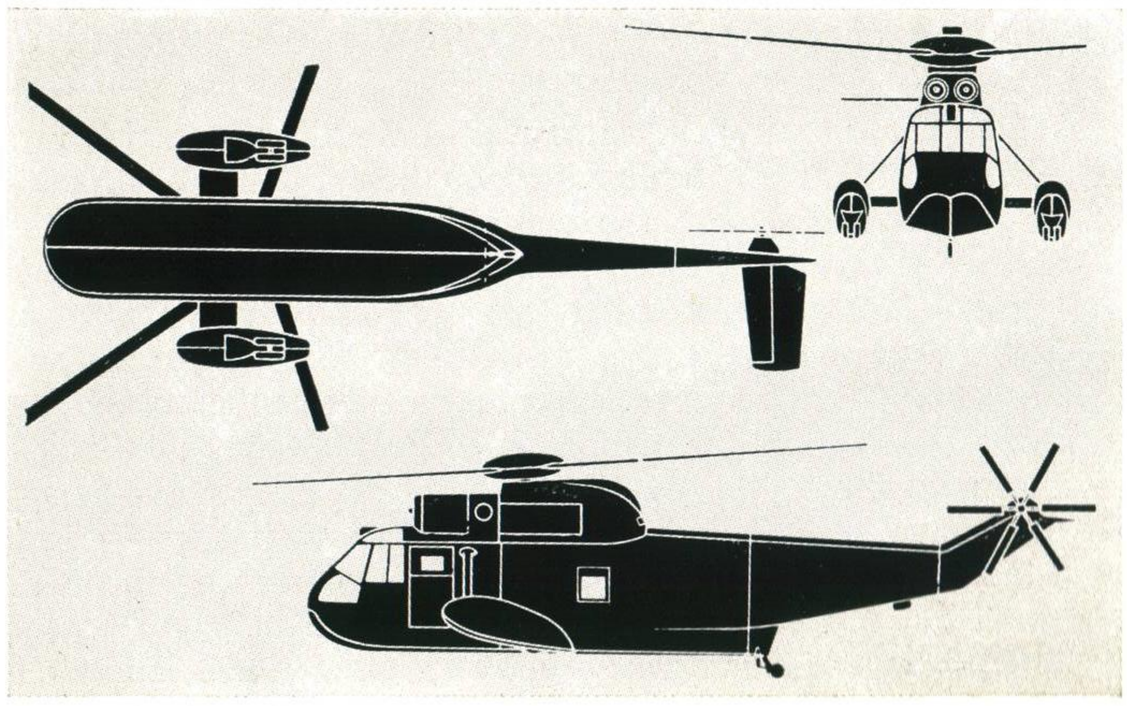
The application of this to high altitude flight should now begin to be apparent. If there is no detail there for the eye to judge whether it is in or out of focus, there is no possibility of obtaining an error signal and, therefore, the eye will not be able to change its accommodation to the level required in order to be in focus so as to detect some distant object which is as yet too small to arouse attention. It is in fact rather like having a camera on which there is no focusing scale. The only way one can adjust the focus is to open up the back of the camera and adjust the bellows until there is a sharp picture. If you are pointing the camera at a cloudless sky, this procedure is, of course, useless. Since the eye does not function in a way in which one can preselect infinity focus or 3 ft. focus, and since the state of accommodation or of focus setting in the eye drifts randomly between near and far focus, on an average the normal eye is most likely to be focused for a distance of 1 or 2 metres. In practical terms this means that although the pilot was looking as he thought at infinity—that is to say anything further than about 12 metres—his eye may have been in fact focused only about the level of the windscreen or just beyond it. On his retina was formed a small out of focus image of the distant aircraft and, as this aircraft approached and as the image grew in size, eventually this still small blurred image grew to such a size that it attracted the pilot's attention. At this stage he was then able to adjust his accommodation rapidly in about one-fifth of a second, so that apparently out of a cloudless and empty sky there appeared suddenly an aircraft some 2 to 5 miles away.

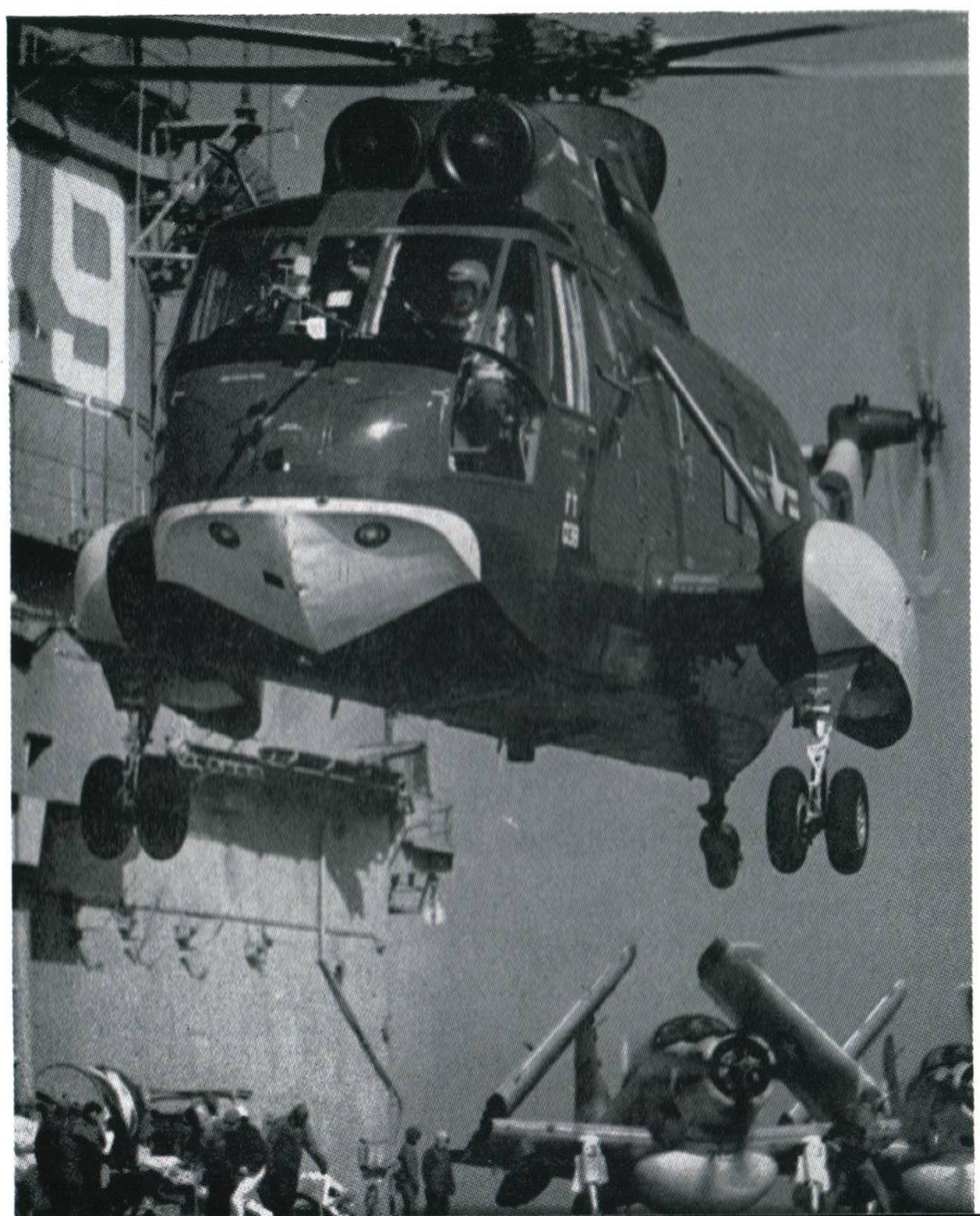
Some individuals, feeling this difficulty in focusing at infinity, may make a voluntary effort to look in the distance, but without the help of something to which the focus of the eyes can be locked, this effort to change accommodation can never deliberately result in relaxing the eyes to infinity. In fact, on the other hand, such an effort to look in the distance frequently causes accommodation to increase, so that the final point of focus may be much nearer than it would have been if no voluntary effort had been made. The sudden realisation that what was thought to be a distant aircraft is in fact a speck on the windscreen illustrates this statement.

Thus, when searching in an empty visual field, it seems to be largely a matter of luck whether an individual focuses his eyes on infinity or not. He can with training learn to avoid the voluntary increase in accommodation and allow his eyes to relax to some extent, but he cannot, without stimulus of infinity, overcome his "empty field myopia" which makes him focus near instead of at infinity.

Continued on page 139







SEA KING

The U.S. Navy's Sea King (SH-3) is the S-61 in the famous Sikorsky helicopter series of which there are several versions in civil and military use. This lesson is confined to those versions conforming to the configuration shown in these key views to which the reporting name Sea King applies. These versions are currently in U.S. Navy, Marine and Air Force service and in the Royal Canadian Navy. It is expected that similar models will shortly enter service with the Royal Danish Air Force and the Japanese Maritime Self Defense Force.

Sea Kings may be seen with external tanks and underslung electronic detection gear. This aircraft was previously presented in the May 1962 edition as the Sikorsky HSS-2 prior to being re-designated and before it was named, instructors should therefore add the name Sea King to the title of that lesson.

Normal lesson instructions, as on page 139, apply.

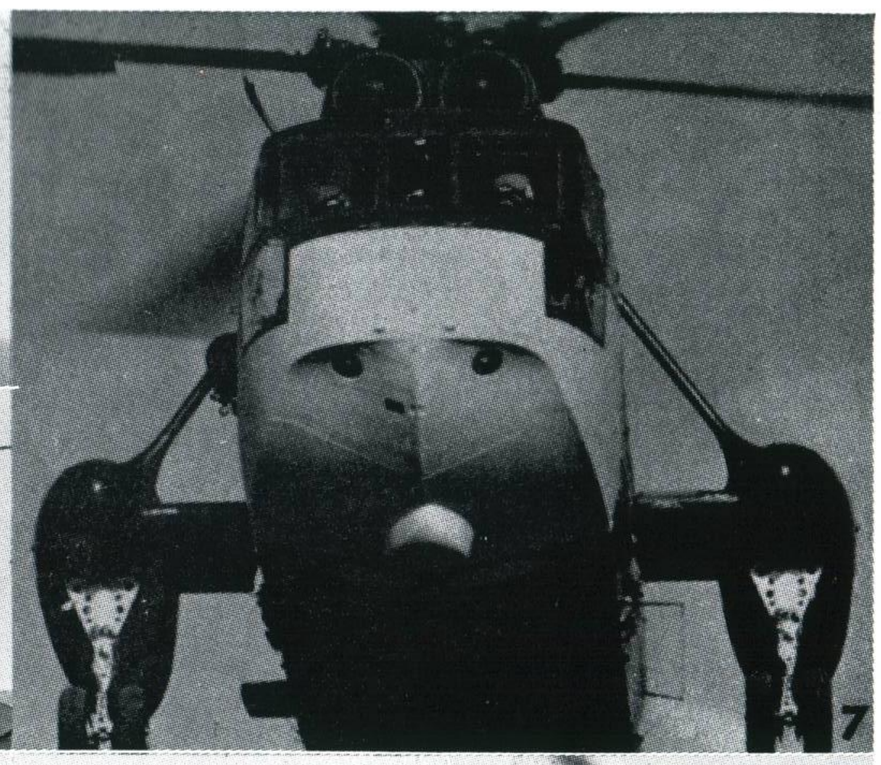




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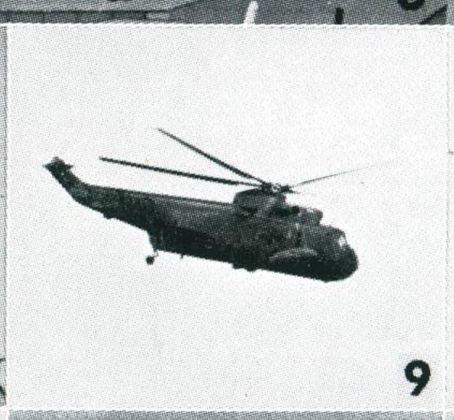
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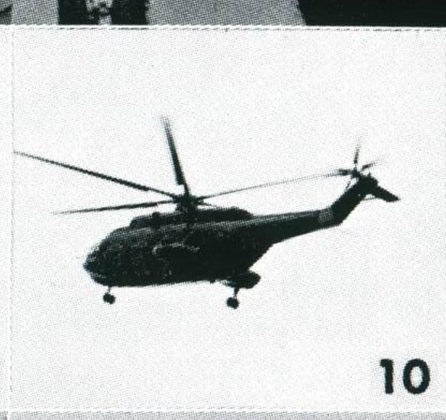
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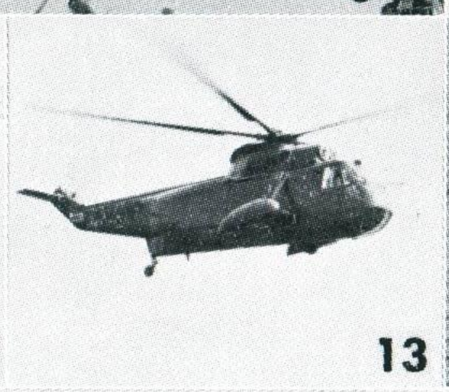
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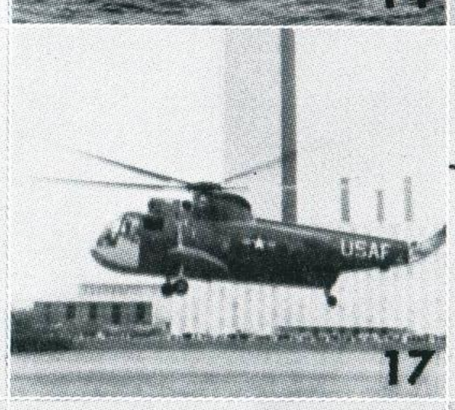
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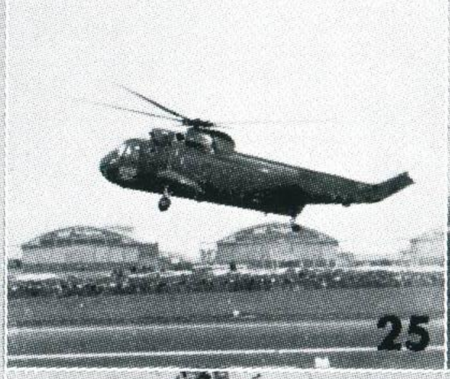
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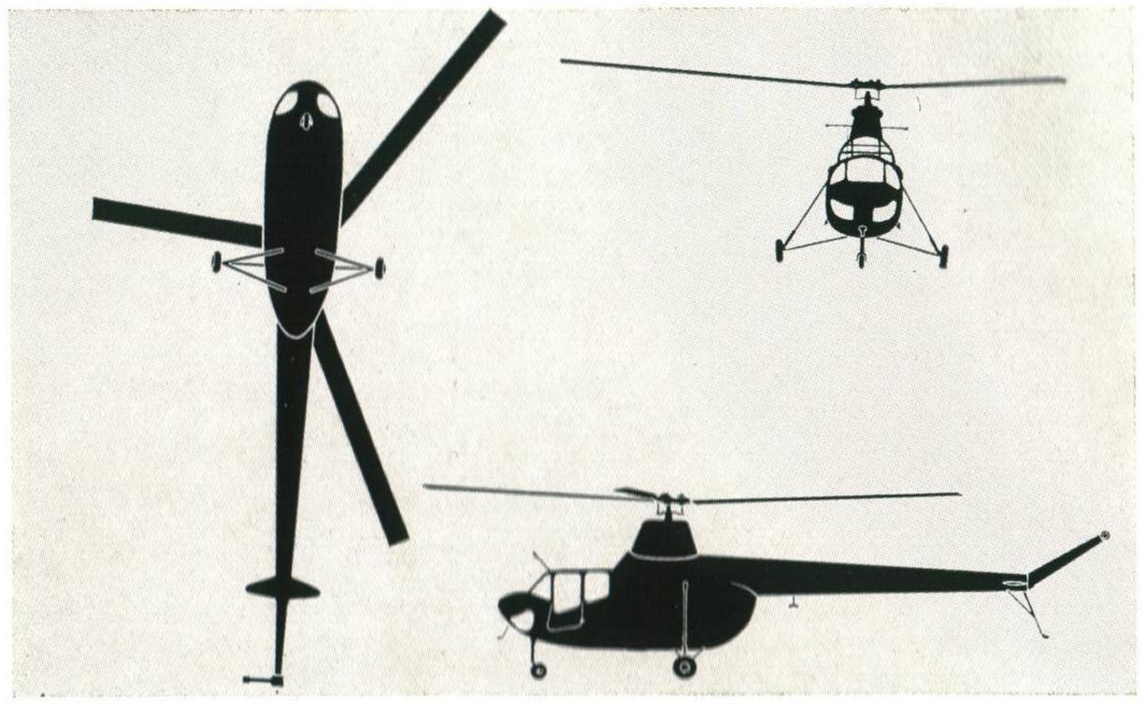
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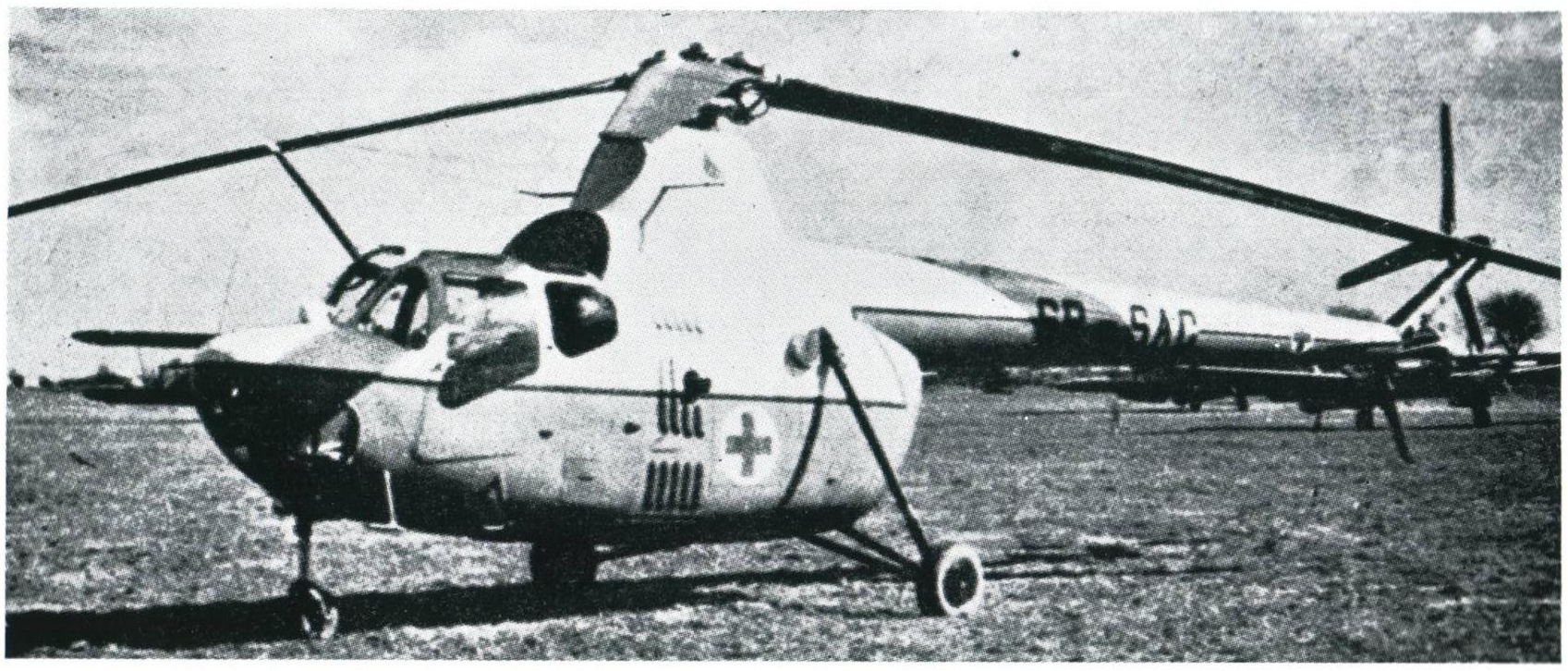
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HARE

This versatile Soviet helicopter, which has been flying now for fifteen years, has been produced in several versions in Russia and Poland for both military and civil uses. Cabin shapes vary, but the main nacelle, tail rotor system and undercarriage all have a common characteristic by which all Soviet and Polish versions can be embraced under the one reporting name—Hare. In accordance with the usual lesson instructions on page 139, identify the targets as Hares or otherwise. Solutions on the cover.



Fuselage length 40 feet



A Polish-built version of the Russian Mi-1 (Mi for Mikhail L. Mil the designer) designated SM-1W by the Poles, the "S" prefix presumably standing for Swidnik, the location of the manufacturer's plant. Produced for liaison, light cargo or ambulance work, some models can be modified to SM-1WS standard with outboard panniers as shown on the Mi-3 immediately below.

The Mi-3 introduced a four-blade rotor to the various Mi-1 versions. Heated and ventilated gondolas to carry patients on stretchers can be fitted to certain Mi-1 or Mi-3 versions in under the hour.





The SM-2 is a Polish development of their SM-1 to seat five passengers. This version, like its predecessor, may be fitted with external gondolas for ambulance work or with agricultural rigs for crop spraying.

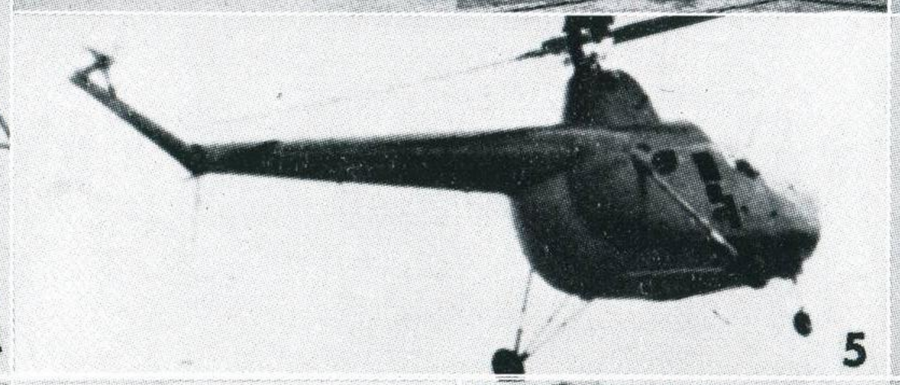

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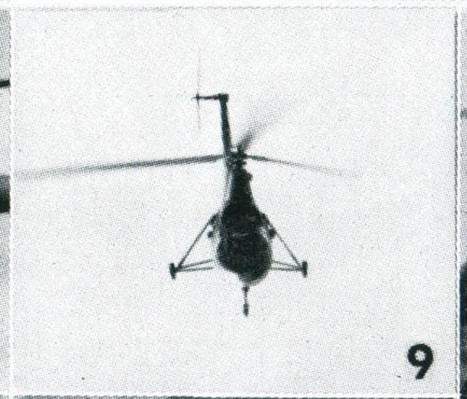
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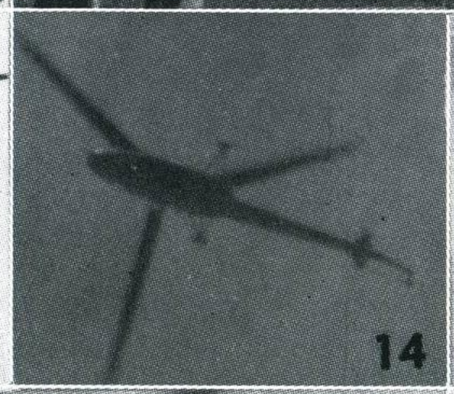

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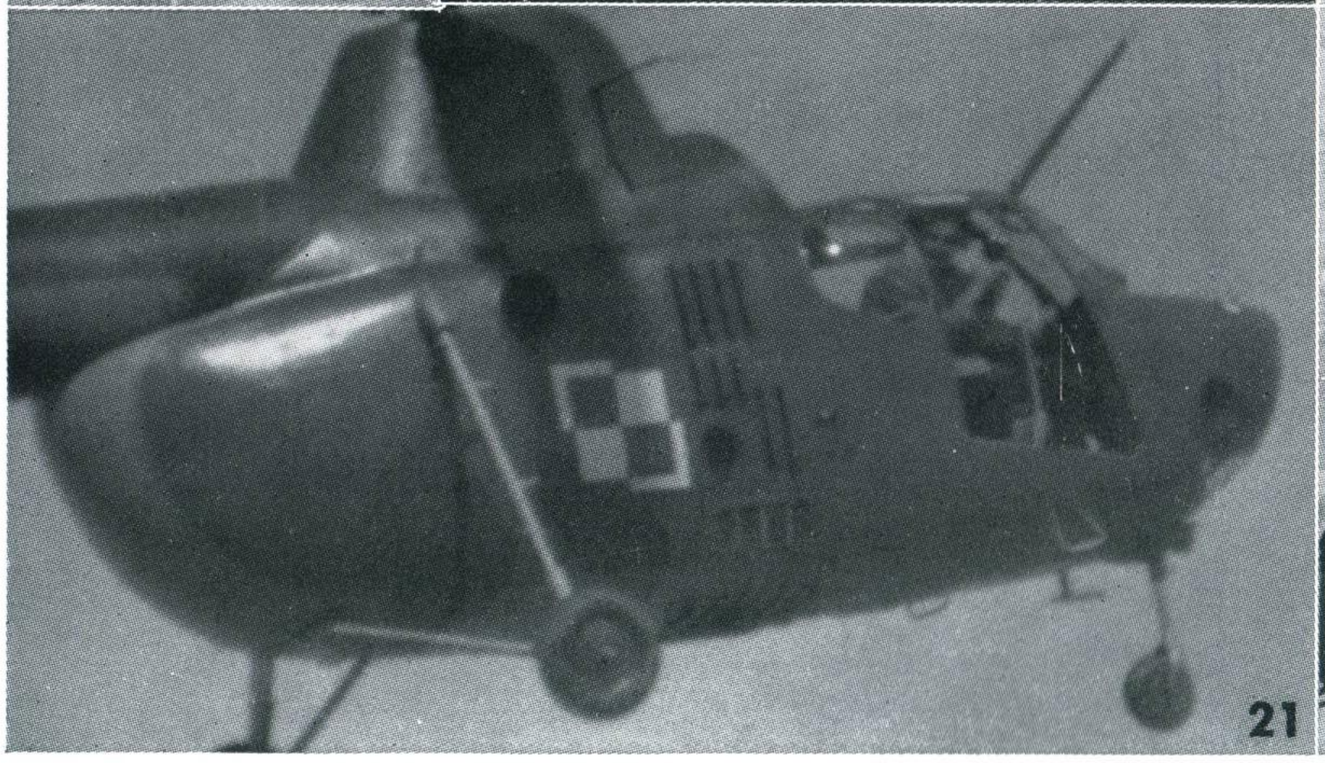

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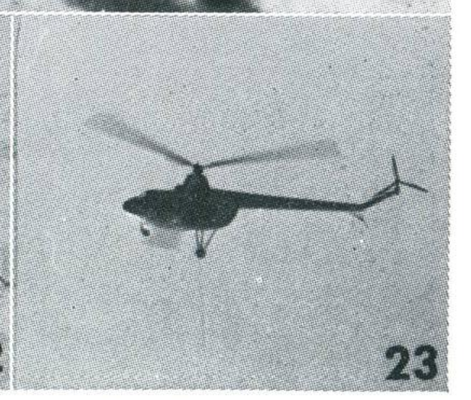

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HARE (Mi-1)




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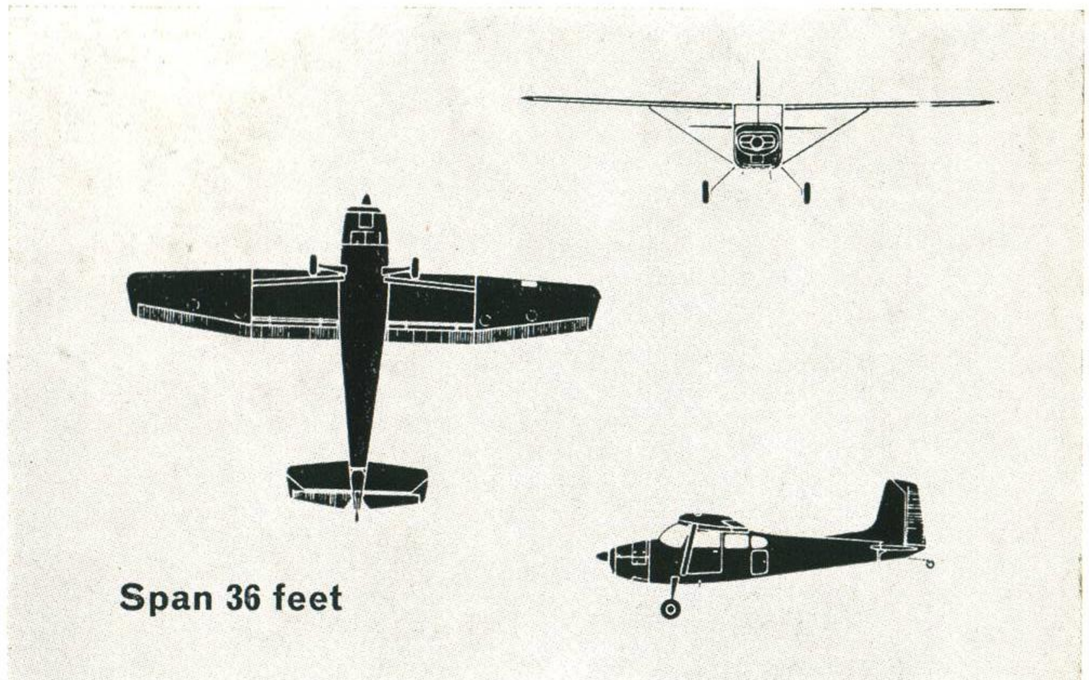

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CESSNA 180

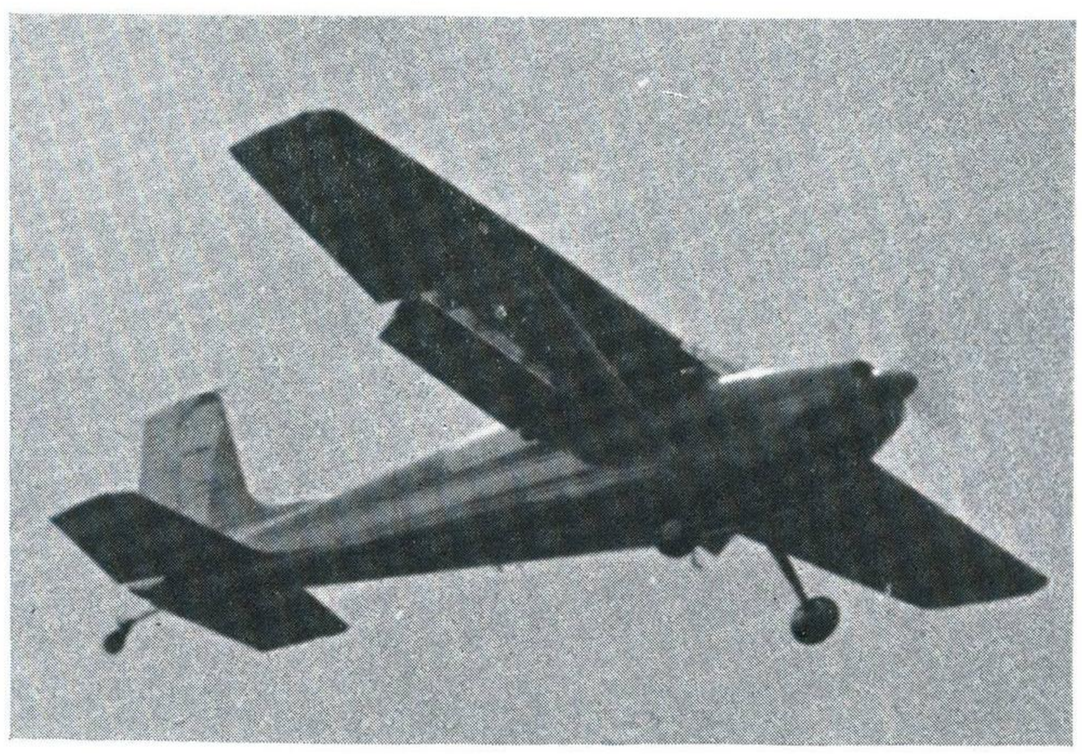
Typical of the Cessna high-wing monoplanes, the 180 series have a conventional undercarriage, unlike the 182 series or some of the other Cessna models. Although the majority of the 4,500 built to the Model 180 standard have been delivered to civil operators including the Indonesian Police (example centre-left), fifteen were supplied to No. 16 Light Aircraft Squadron of the Australian Army.

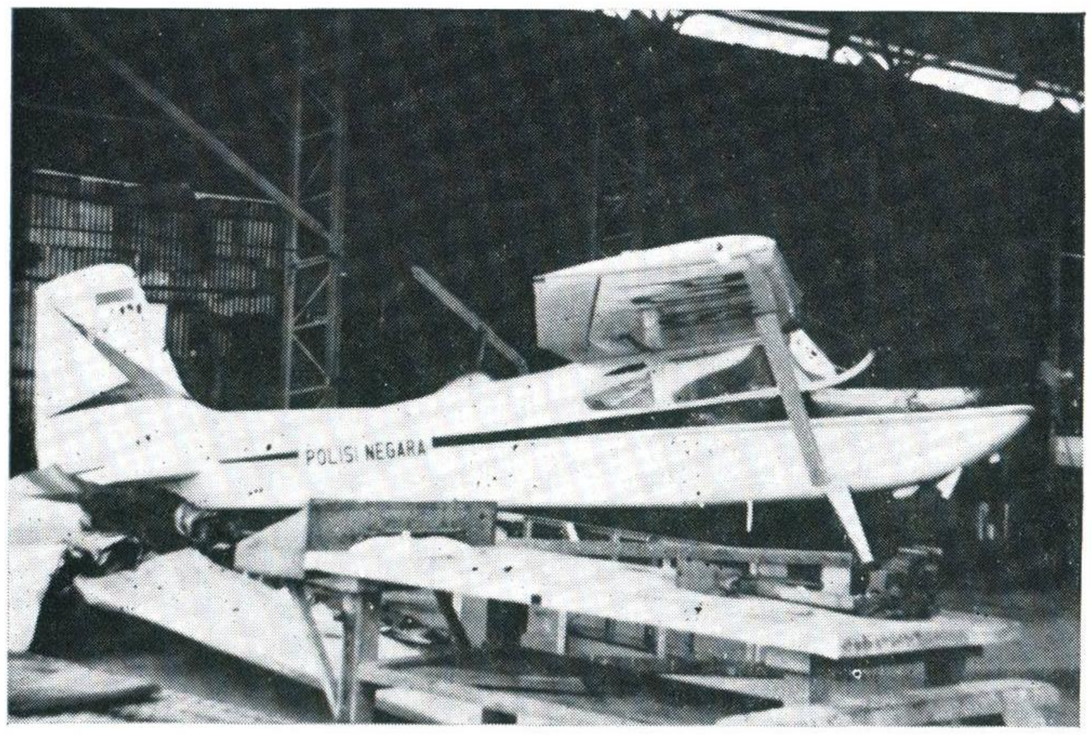
Versions of the Model 180 series vary slightly in cabin space and window shape.



Span 36 feet





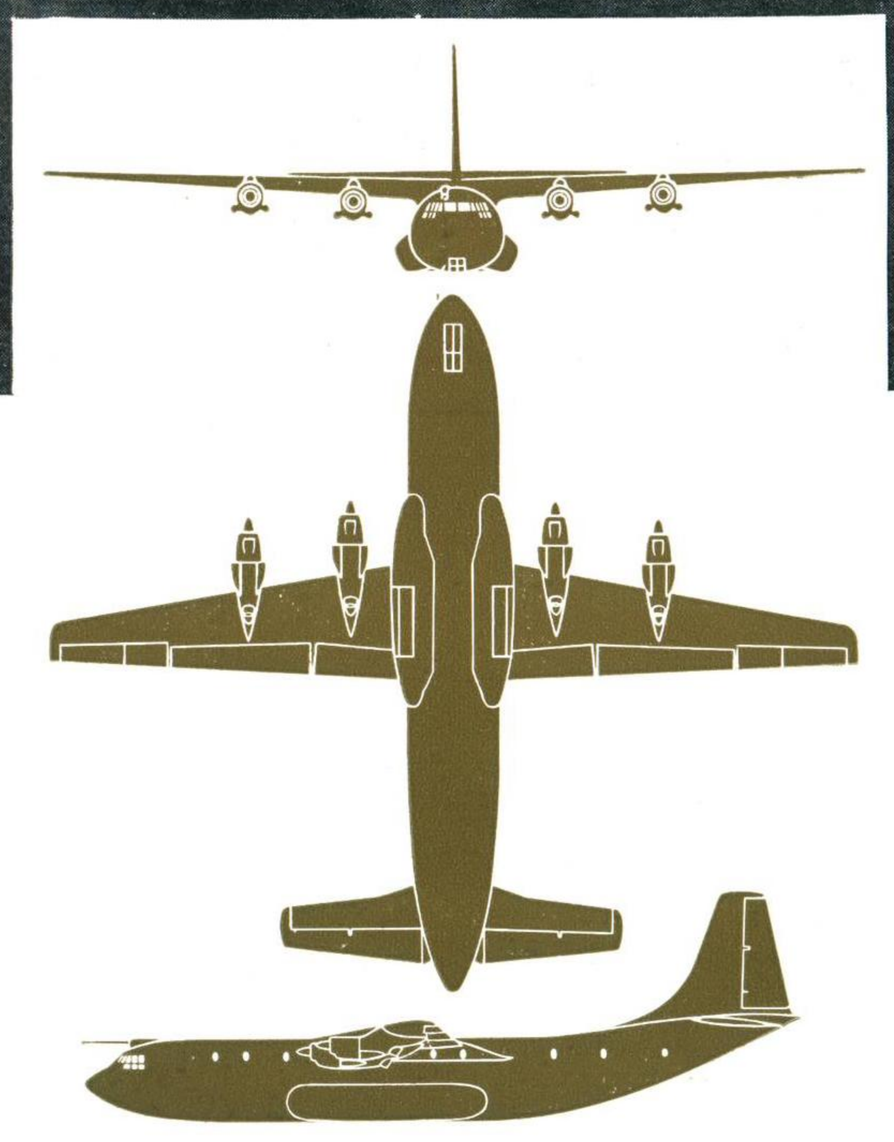












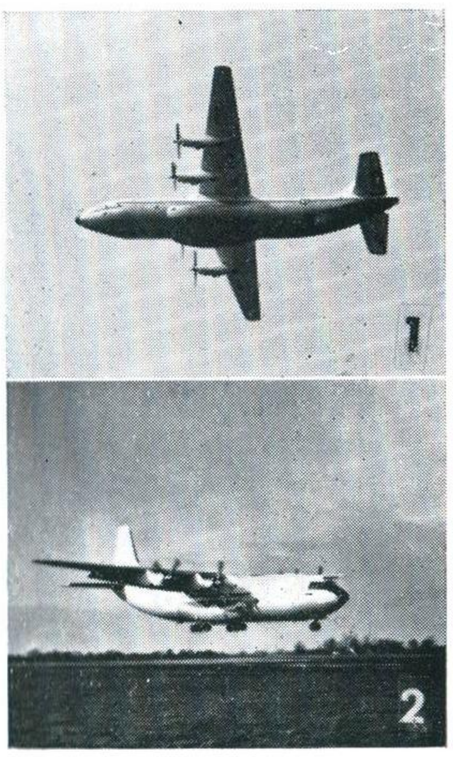
BELFAST

Designed to carry heavy freight including A.F.V.s, guns and missiles, the Belfast features "beaver-tail" rear loading doors to facilitate entry. Ten have been ordered for R.A.F. Transport Command.

The Belfast's large wheel fairing gives this four-engined turboprop transport a configuration not dissimilar to the American Cargomaster and Hercules, and Russian Cat and Cub, so work diligently to the instructions on page 139 to learn to identify this new British transport.

Span 159 feet





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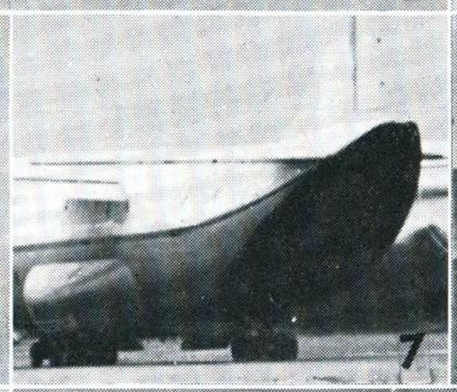
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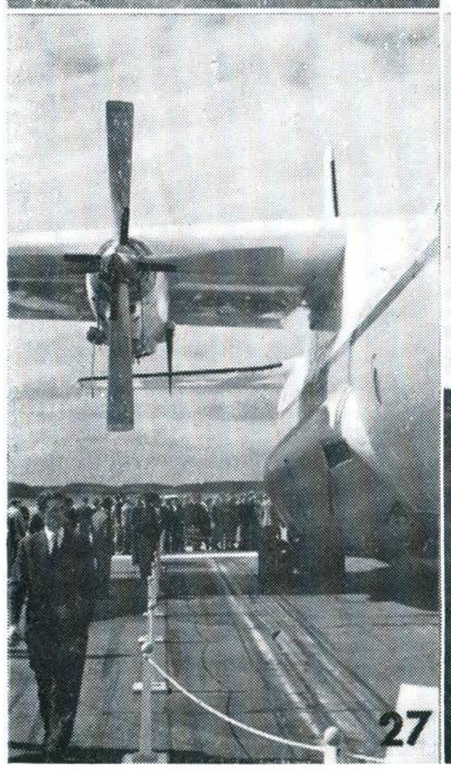

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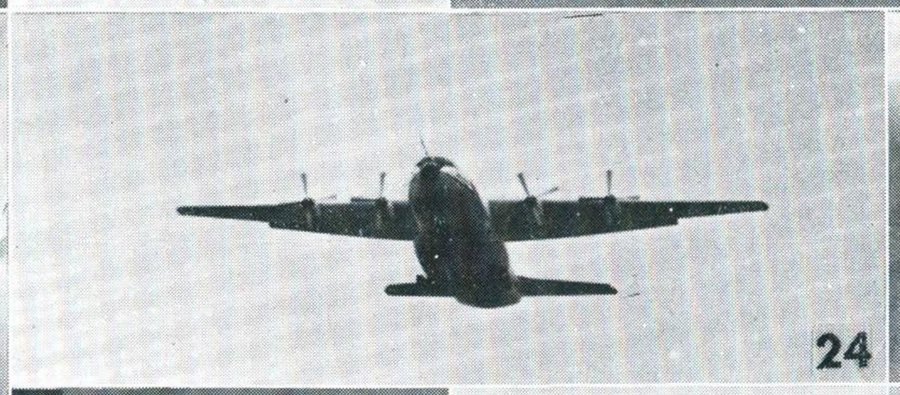

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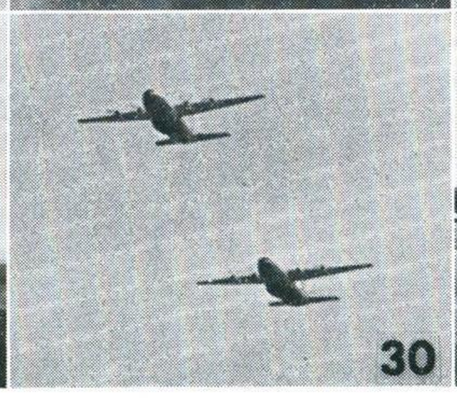

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CESSNA T-37

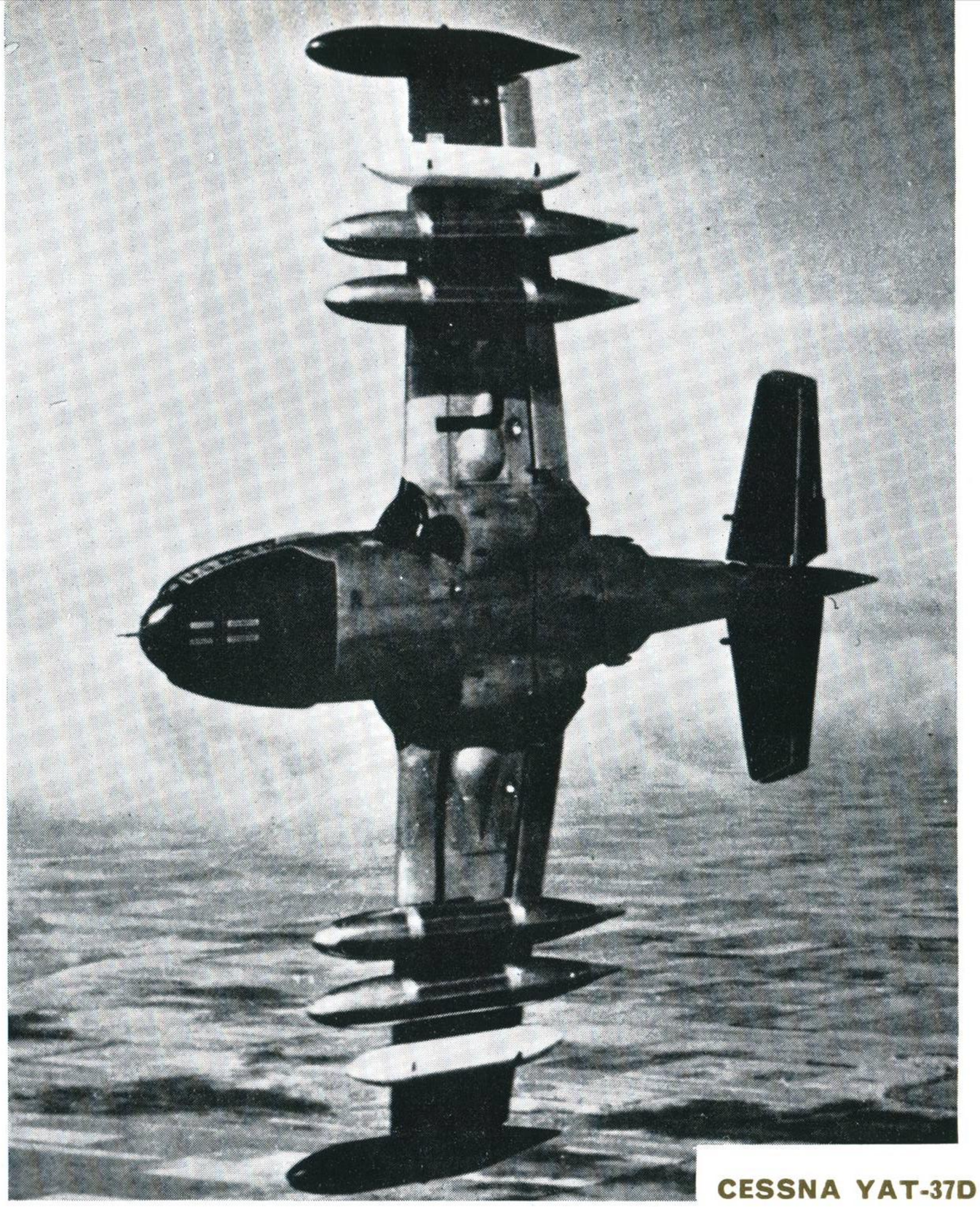
The Cessna T-37 is the United States equivalent of our Jet Provost and like the latter, armed versions have been exported.

Visual variations in the T-37 series from T-37A to T-37B concern only the fitting of wing-tip tanks and the provision for various armaments.

The version designated YAT-37D is under development for a counter-insurgency role.

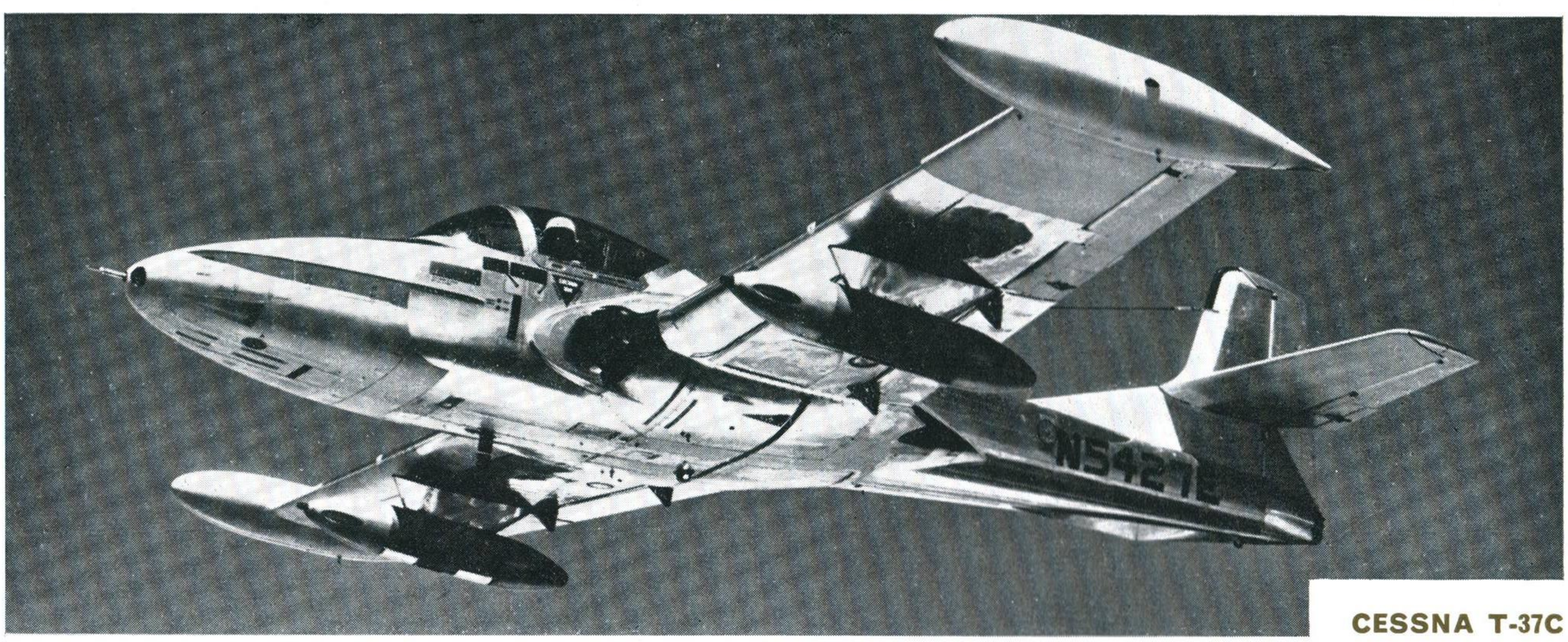
Air Forces using Cessna T-37s are the American, Peruvian, Royal Hellenic, Royal Thai, Portuguese and Pakistan. Powered by two turbojets this aircraft attains a top speed of over 400 m.p.h.

Work to the lesson instructions on page 139. Solutions on the cover.



CESSNA YAT-37D

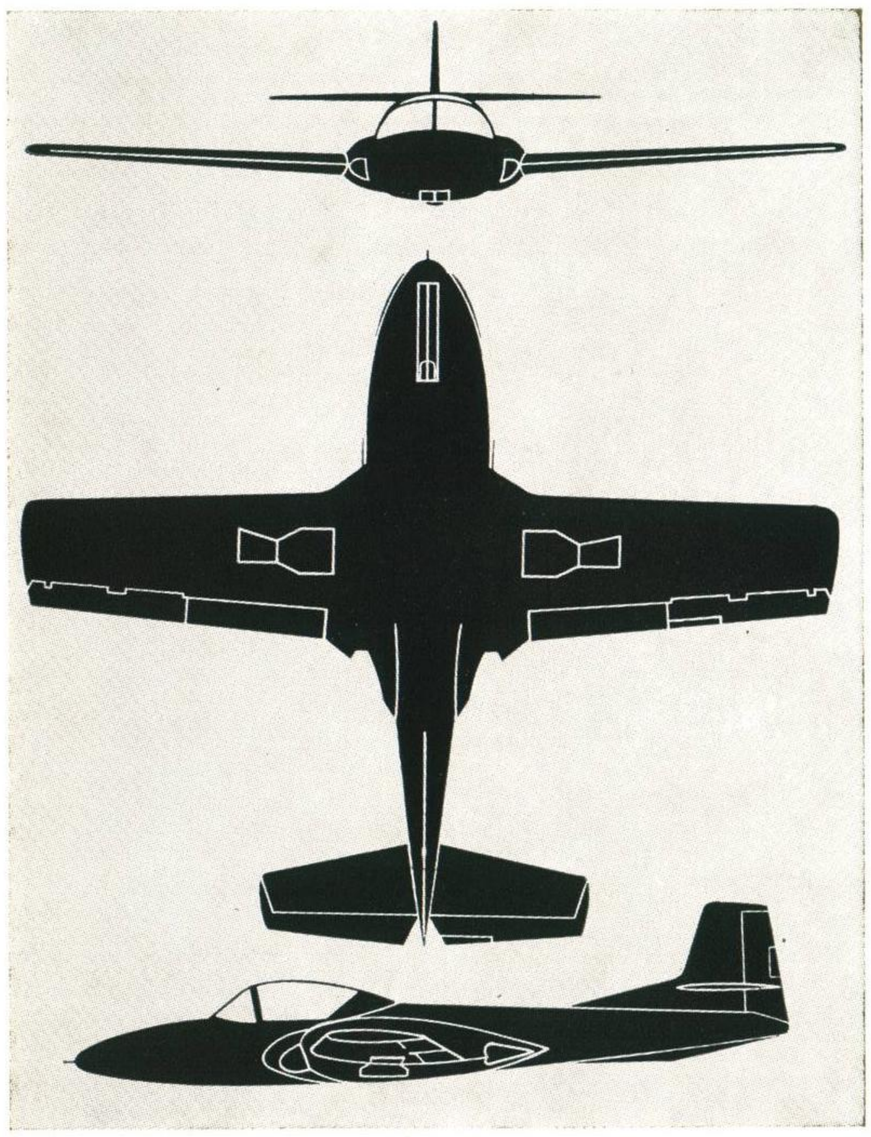
Span 34 feet

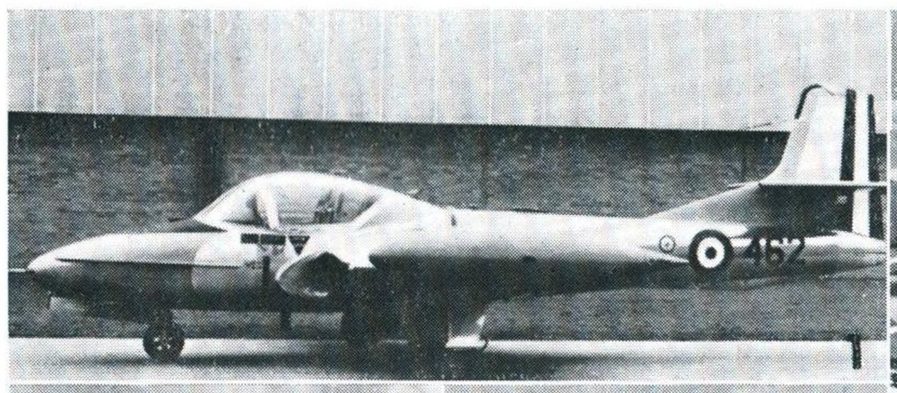


CESSNA T-37C



CESSNA T-37B





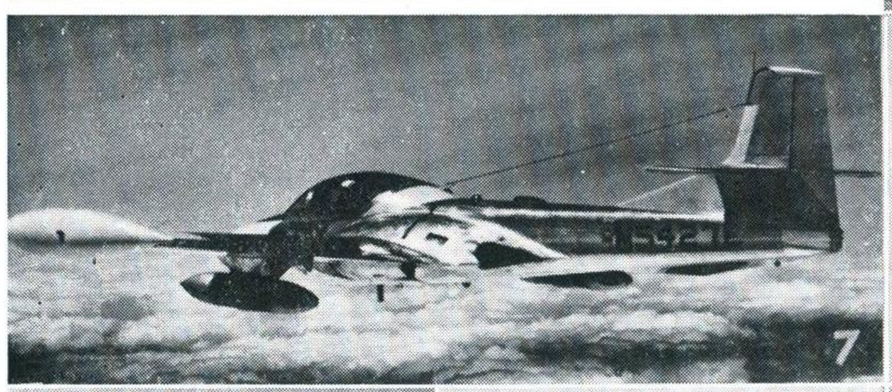


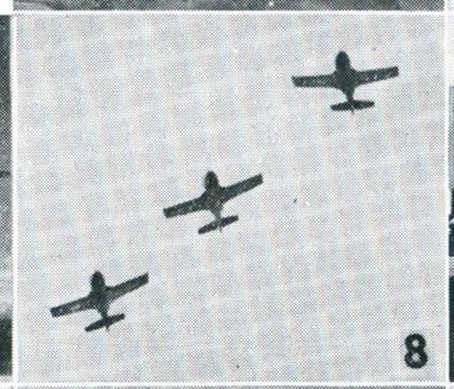


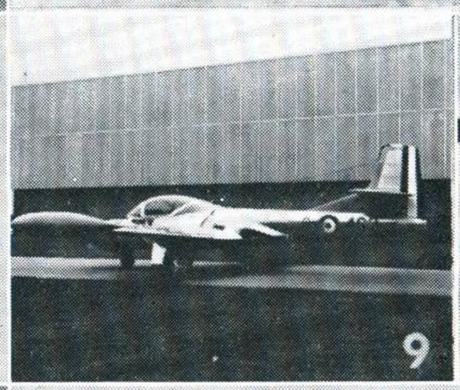
























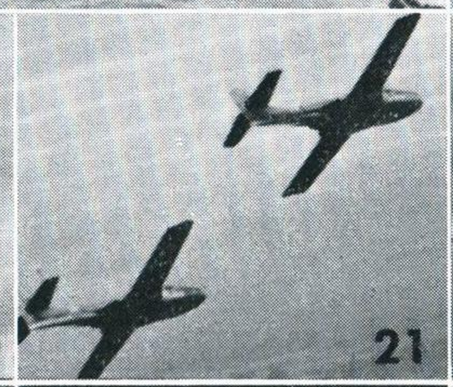




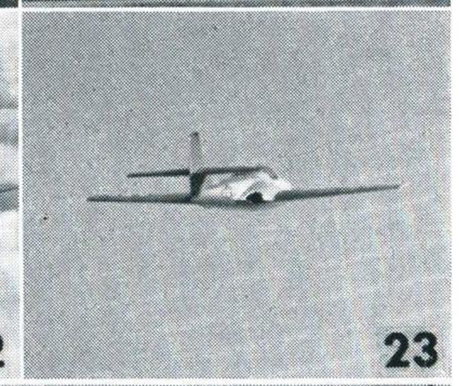


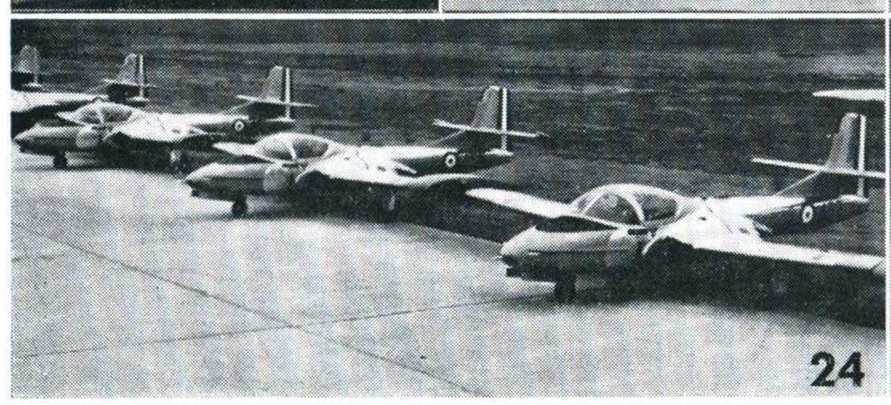


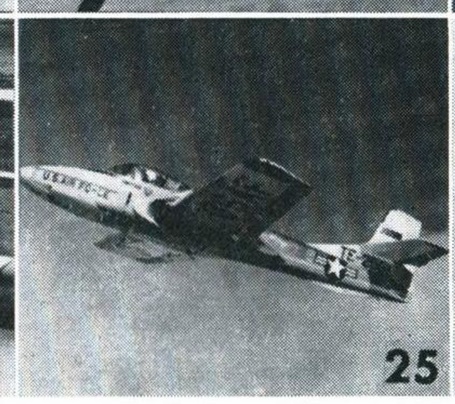


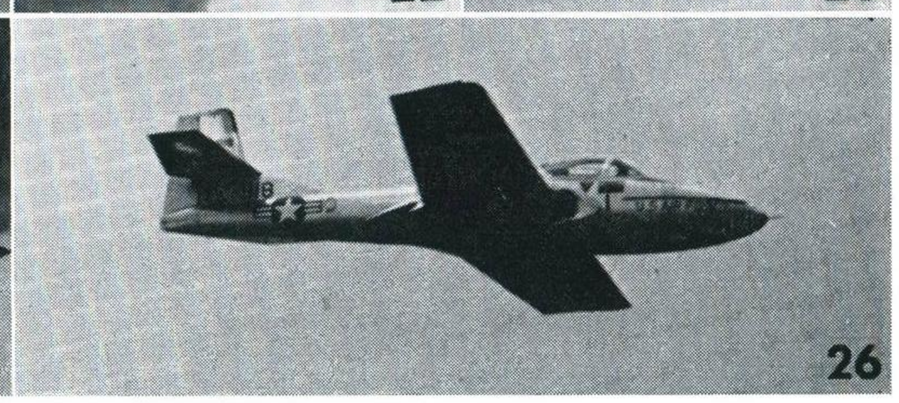












Testing Time

A test of your ability to identify military and civil aircraft of the World.
Solutions on the cover.


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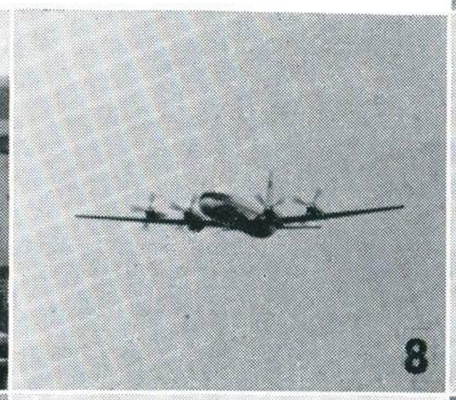

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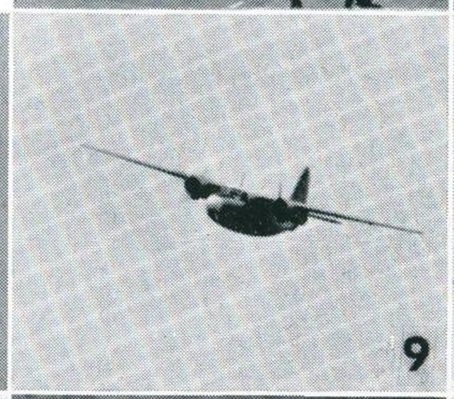

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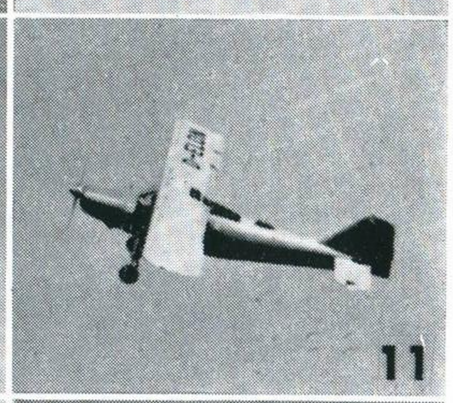

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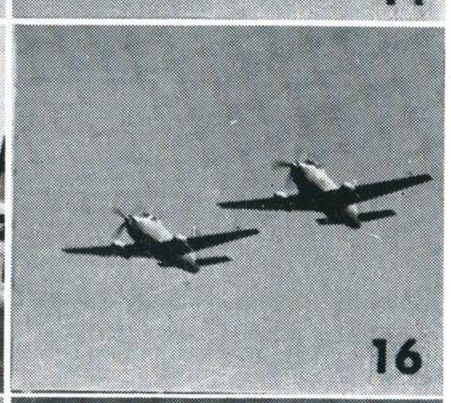

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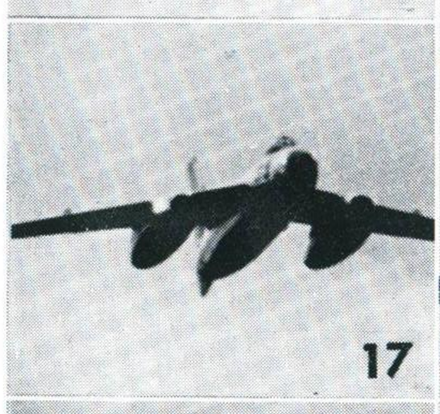

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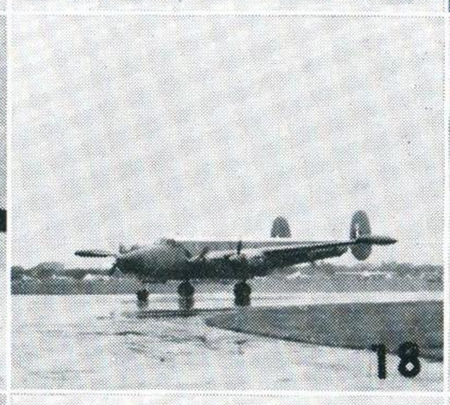

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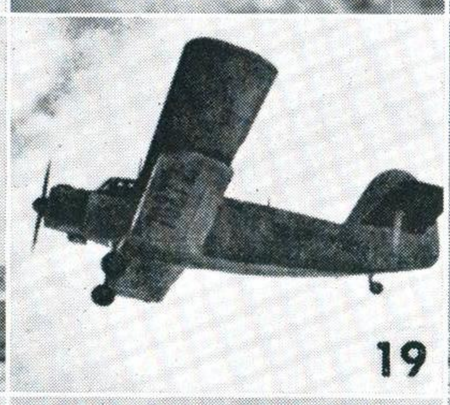

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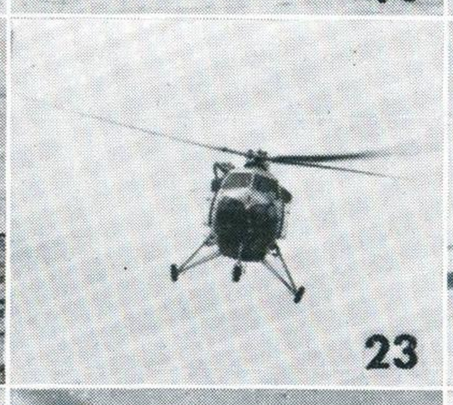

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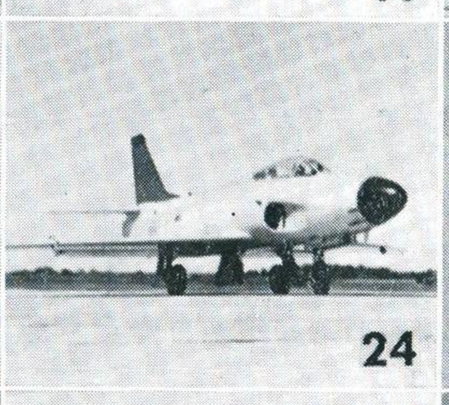

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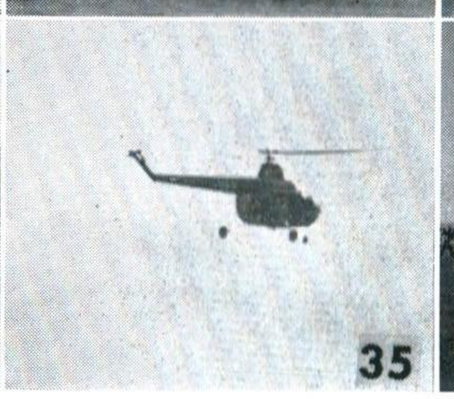

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BRIEFS

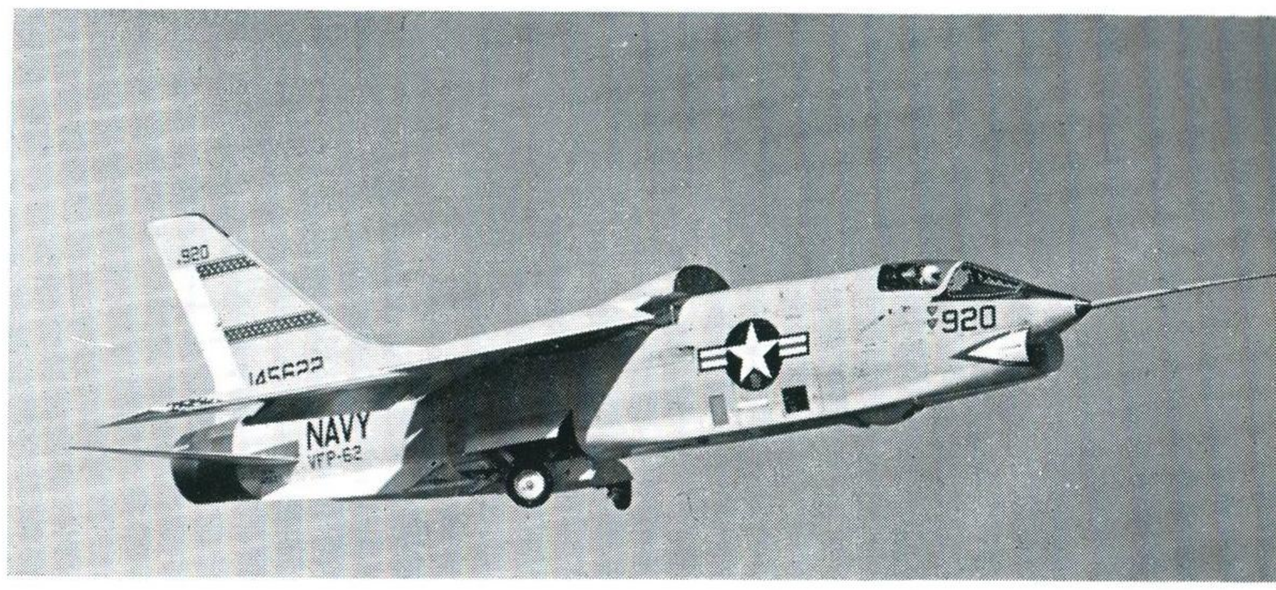
ITEMS OF NEWS AND INTEREST TO AID IDENTIFICATION



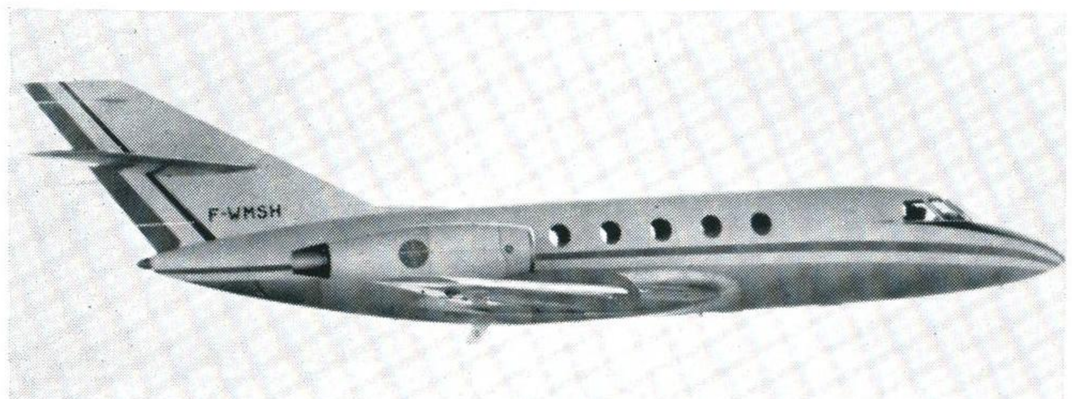
The Convair 990A **Coronado** of which American Airlines, Varig, Garuda Indonesian Airways and Swissair are the major users.



An example of one of the eight TB-52A **Hustlers** with increased window space, for transition training of jet pilots to the B-52A.



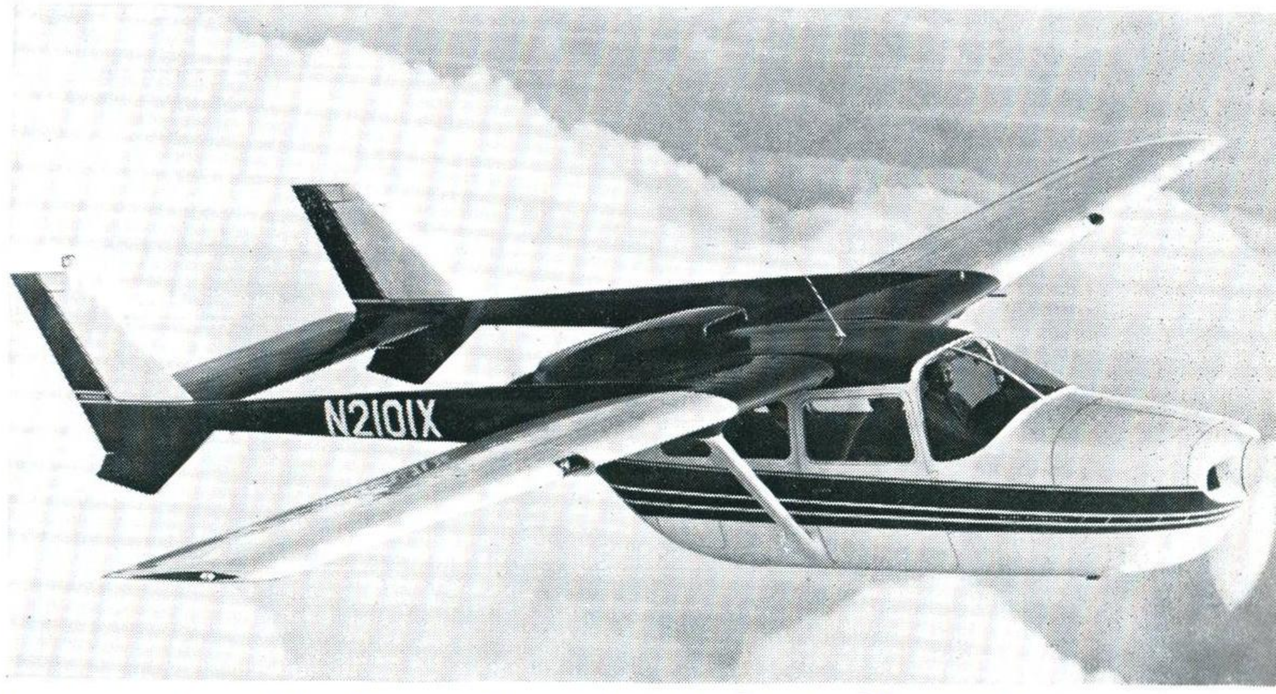
A **Crusader RF-8A**, one of many being modernised for continuing service in the U.S. Navy. No identity problem arises.



The new French Dassault **Mystère 20**, light twin-jet executive transport, which is being marketed in America as the Falcon.



A promising French feeder-line transport, the Potez 840 series, shown here in the **Potez 841** version with American turboprops.



A new version of the Cessna Skymaster, the **Super Skymaster,** features a retractable undercarriage among other refinements.



The **Charger** is a prototype built by General Dynamics for a U.S. Navy design competition for a COIN role. It could be used for surveillance or reconnaissance, close air support including helicopter escort and carry up to six paratroops or 6,000 lb of supplies.

RIGA CLASS (U.S.S.R.)

These Destroyer Escorts of which there are some 50 units are improved Kola Class escorts of flush deck design.

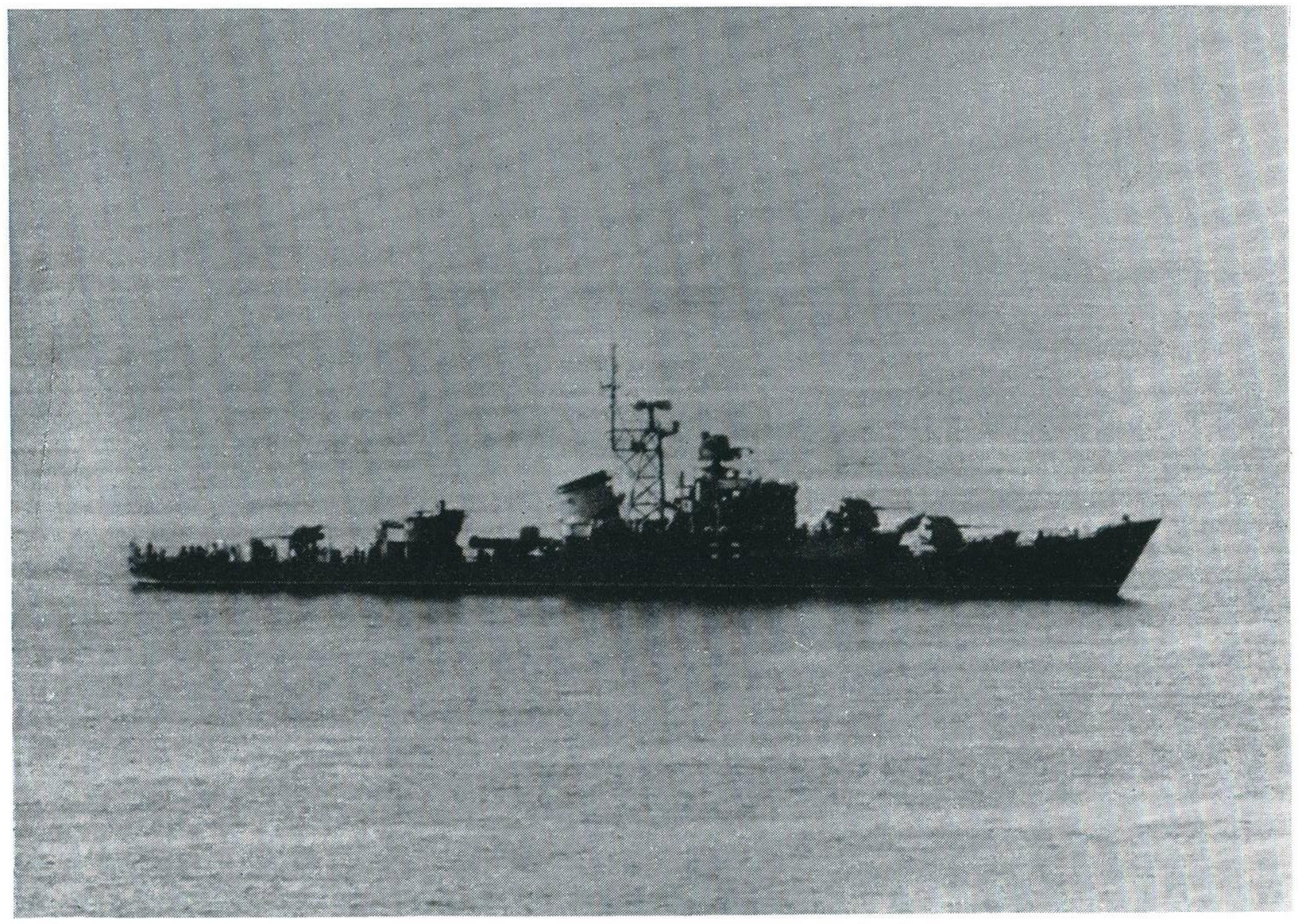
They are not so heavily armed and are lighter than the Kolas and displace 1,280 tons full load. 295 feet long overall they are powered by geared turbines giving a speed of 28 knots.

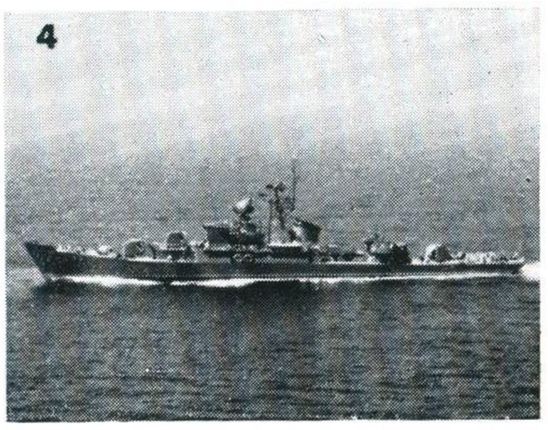
Armament consists of 3×3·9-inch dual purpose guns, two forward and one aft, 2 twin 3·7-mm AA guns and 3×21-inch torpedo tubes. They are equipped with 4 depth charge throwers and either a Hedgehog type or two 16-barrel anti-submarine mortars forward. They are also fitted for minelaying.

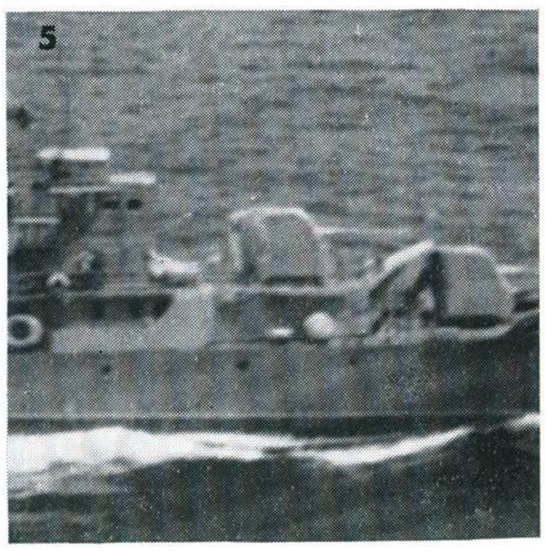
In appearance they are distinctive by reason of the very steep sheer forward; the large bridge and very heavily raked thick funnel with cowl top. Actually there are two types distinguished by the different mast structures, but no distinguishing names are given. The later version has the more comprehensive aerial systems on a stouter mast and most ships are so fitted.

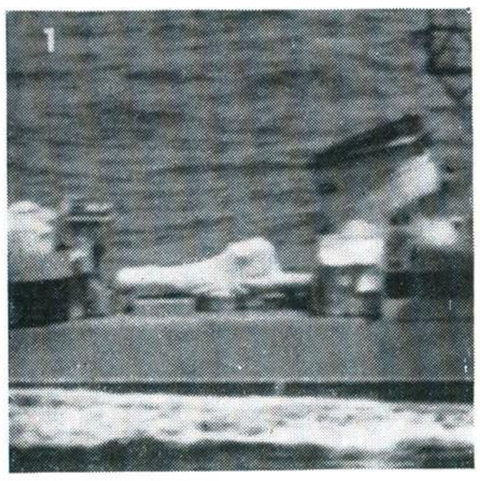
Several ships of this Class have been transferred to other countries in the Communist Bloc and to Finland and Indonesia. Communist China has built four Rigas of the later class.

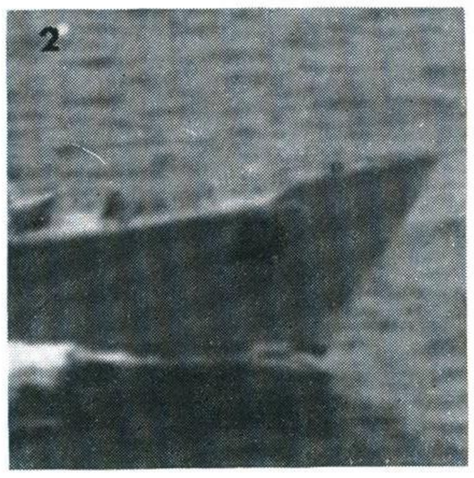
Solutions on the cover.









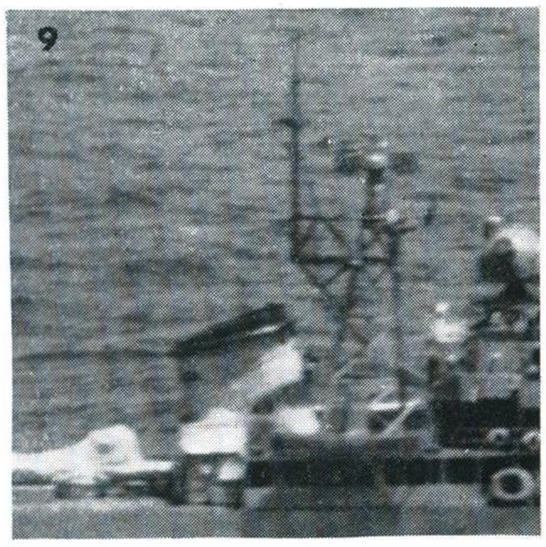


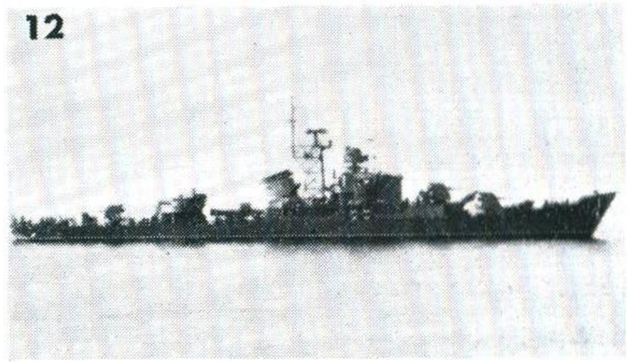




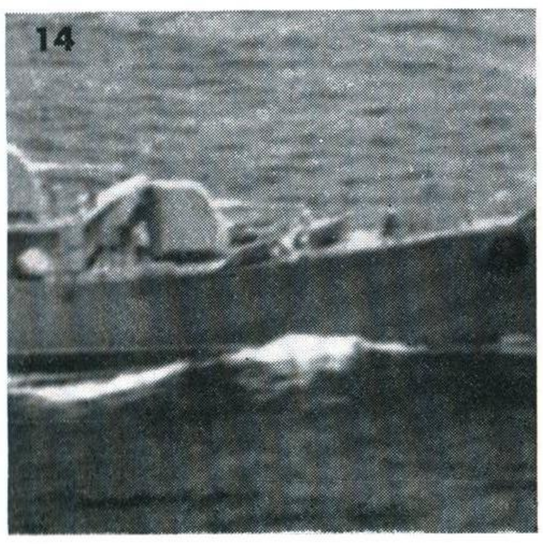


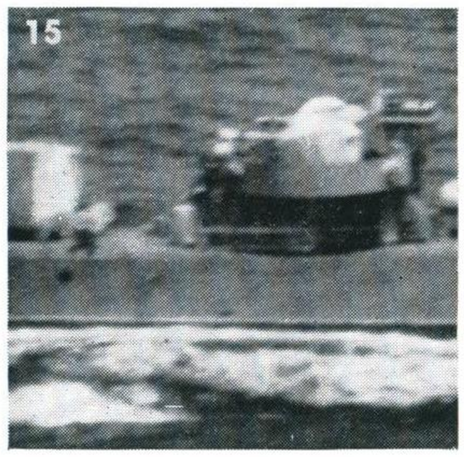




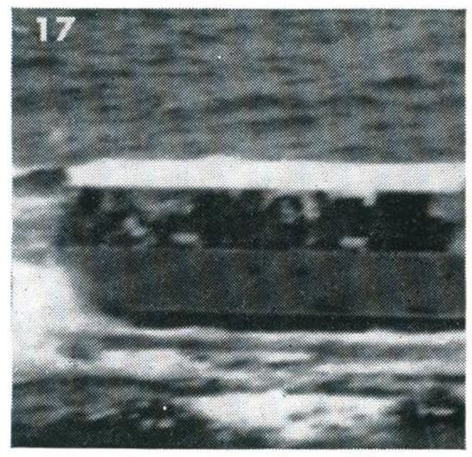


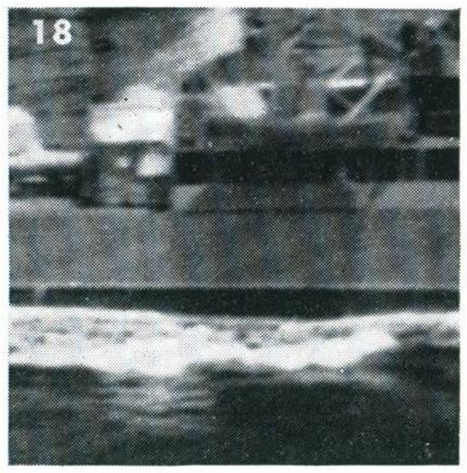


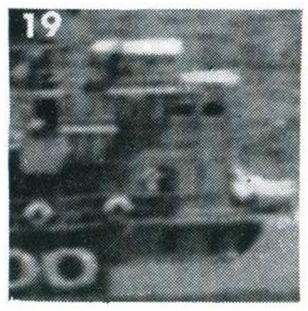


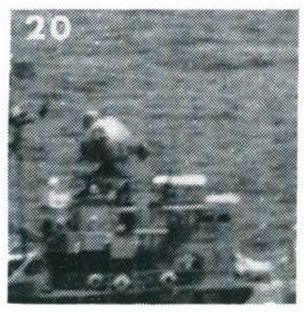

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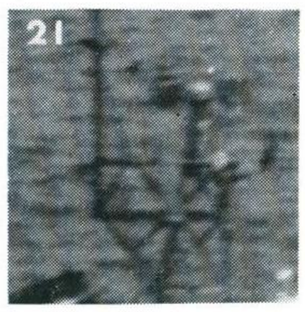

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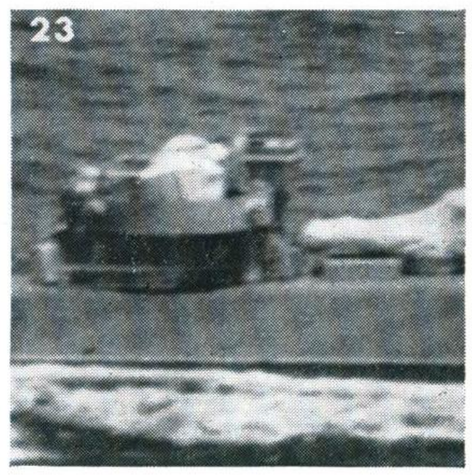

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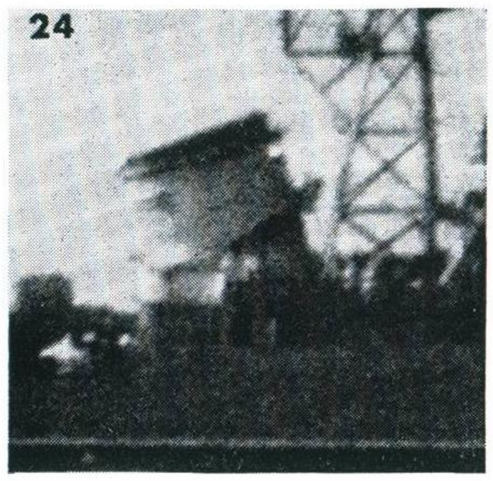

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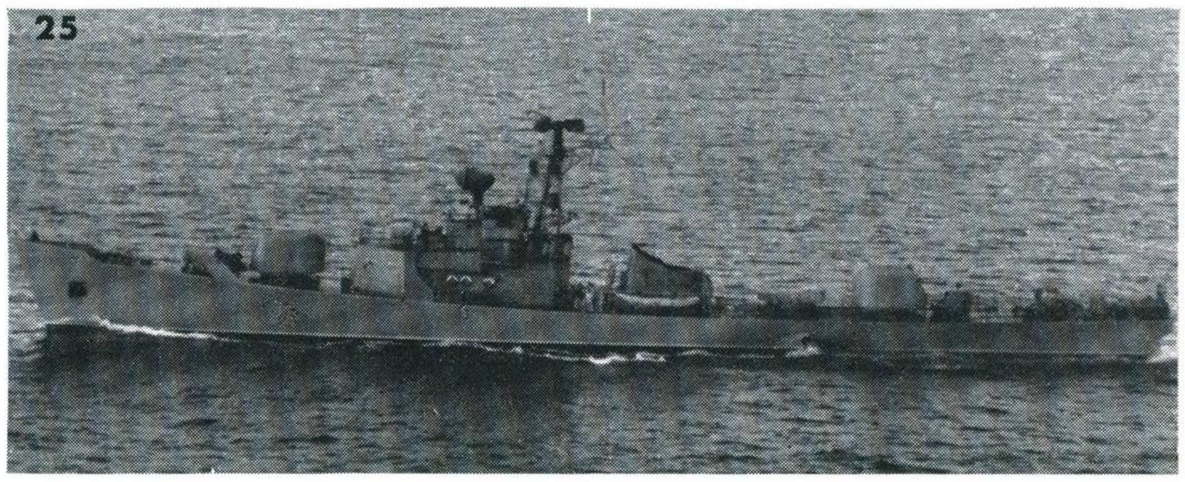

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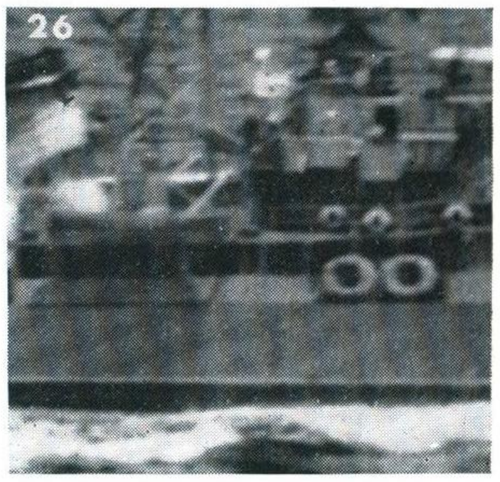

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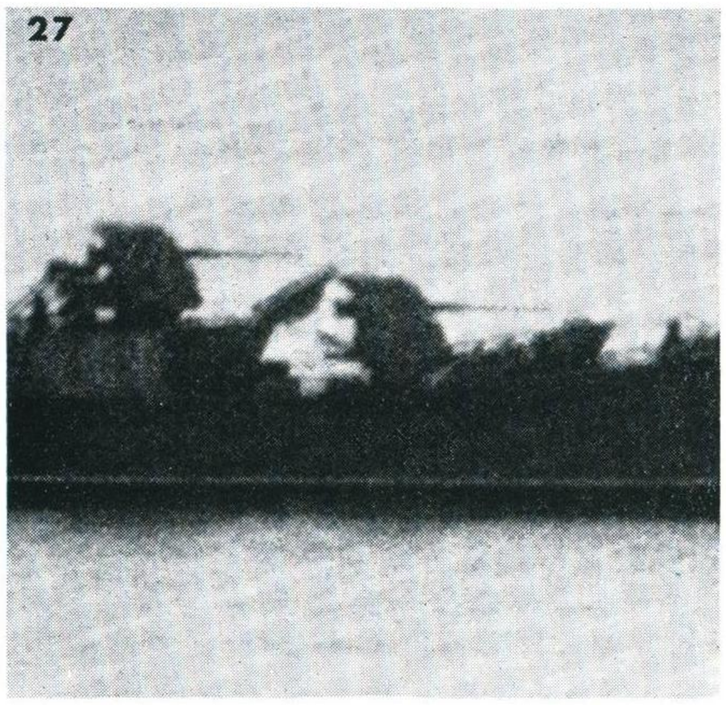

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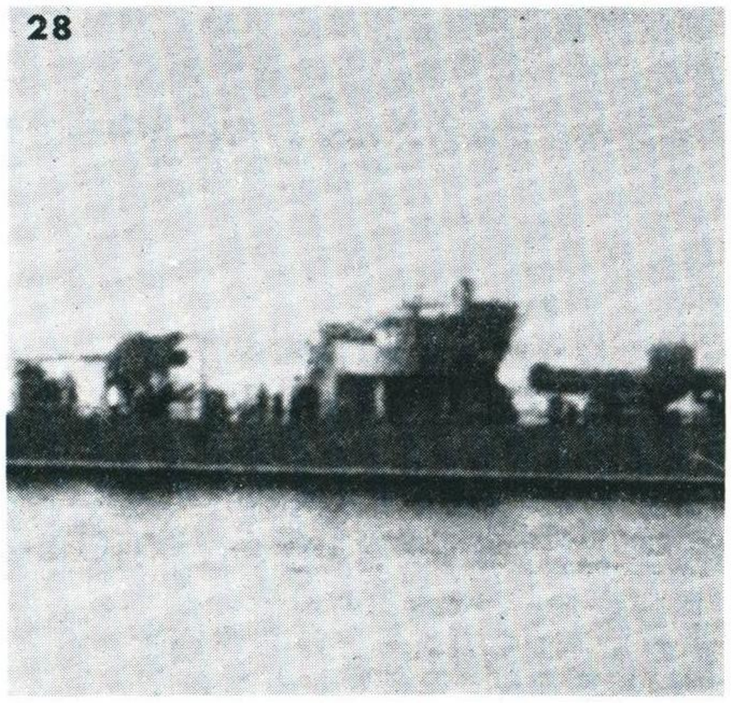

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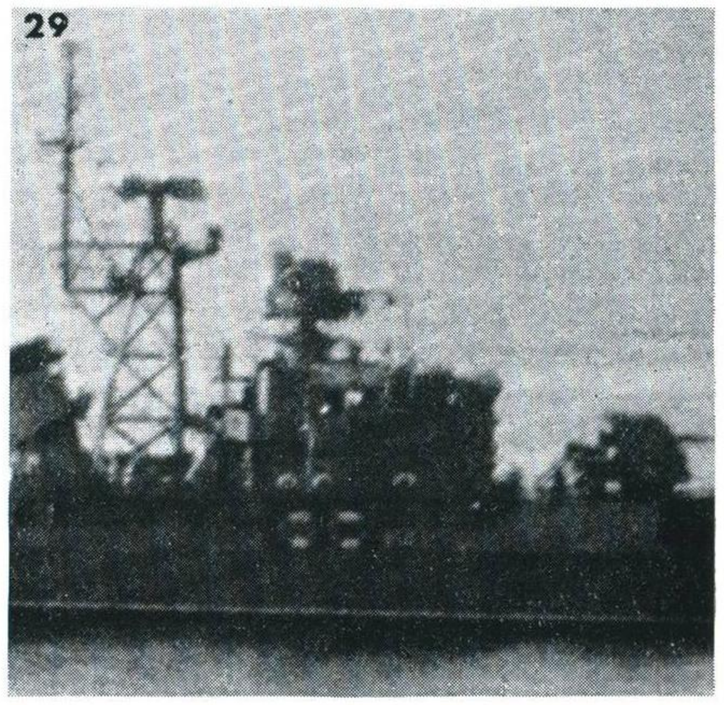

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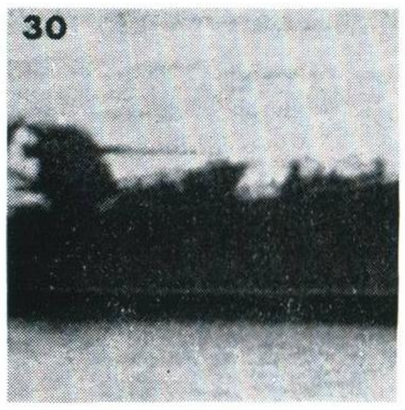

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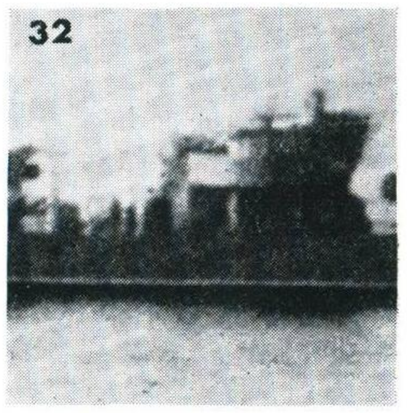

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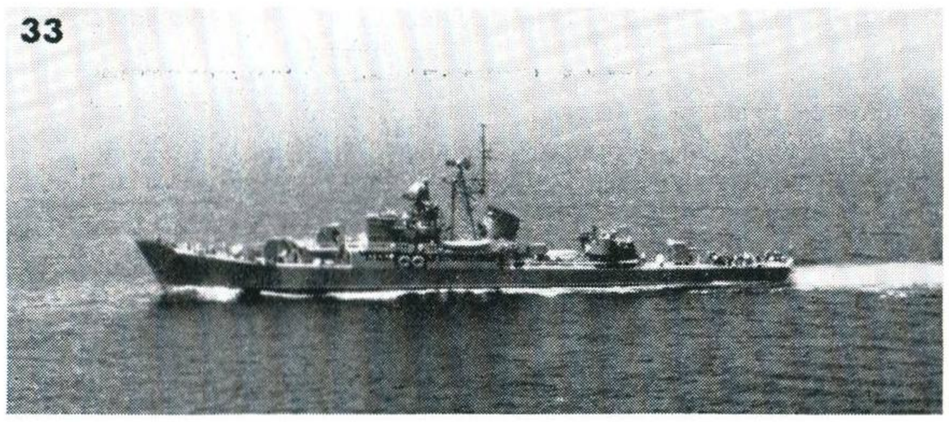

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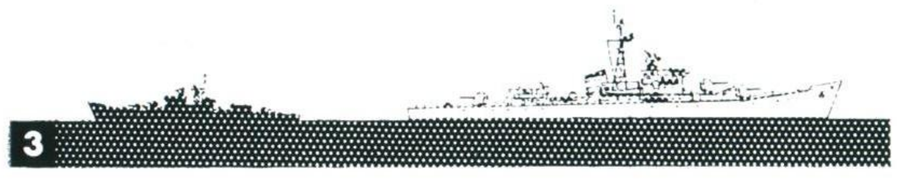

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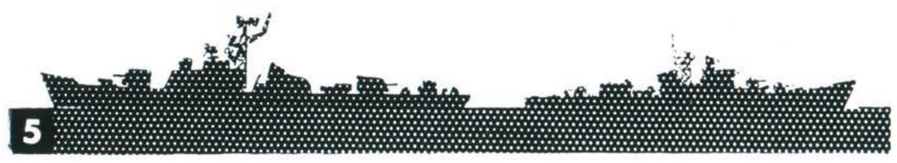


Continued overleaf

RIGA CLASS continued

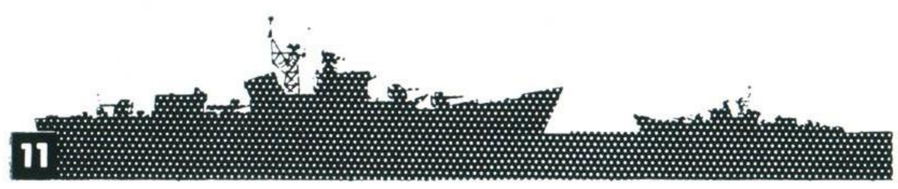


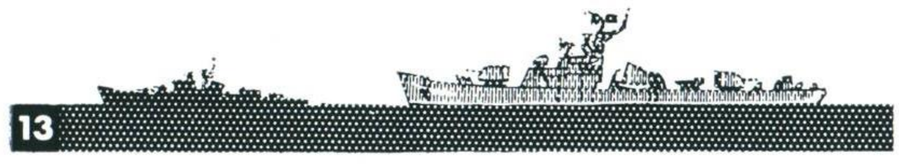


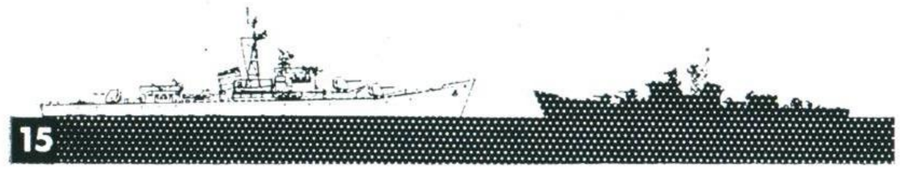




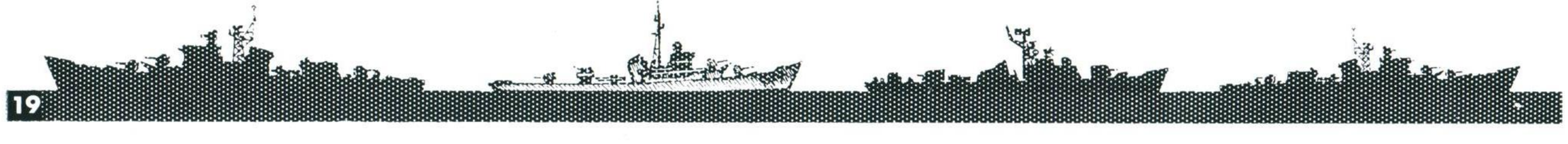








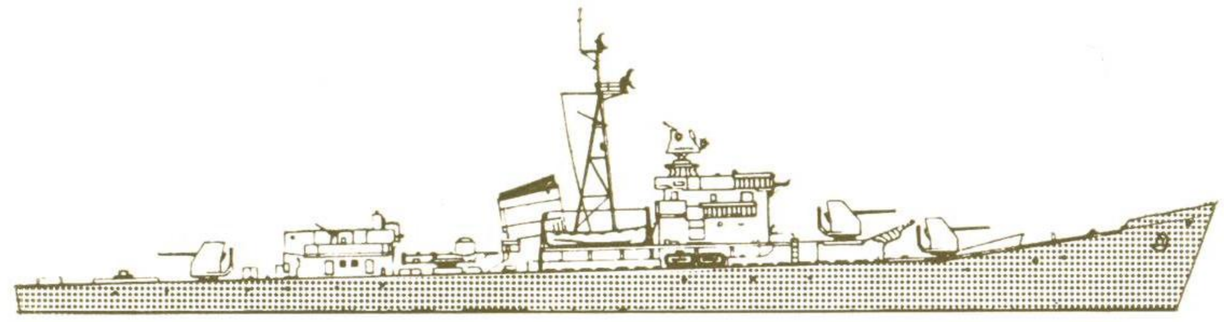




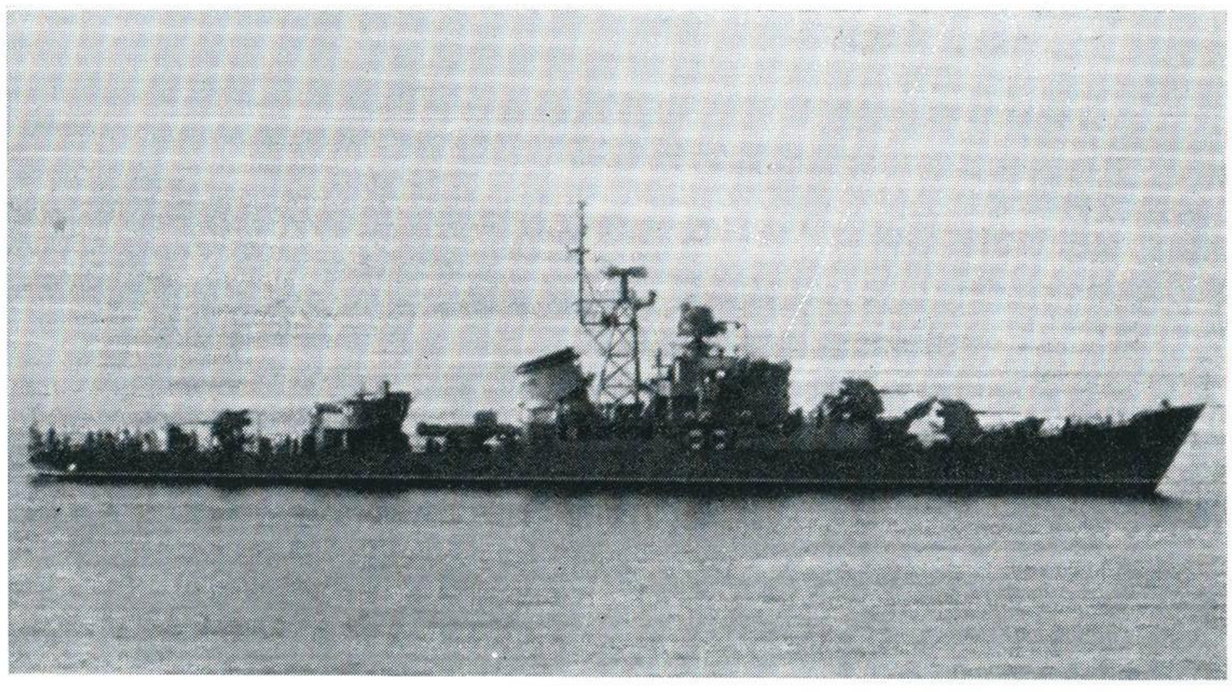








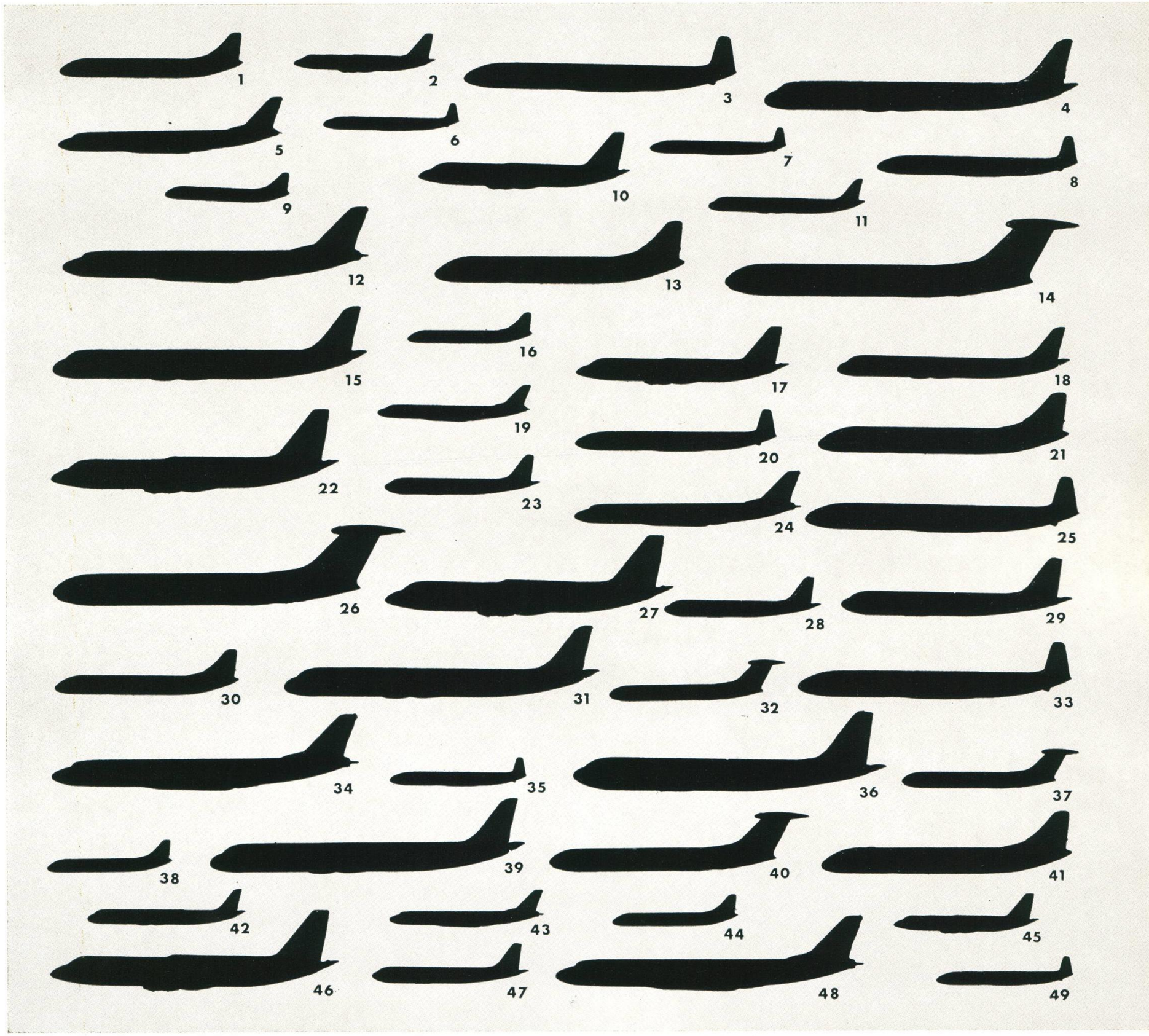




Solutions on the cover

AIRCRAFT IN PROFILE

It used to be said that the side view of an aeroplane displays more of its visual character than any other view, the inference being that it would be more easily identified in that view. Is this still true today? Possibly it is less true, and here is your chance to find out so far as the "big-jets" are concerned. A key is provided and solutions appear on the cover.



KEY



Caravelle



Comet



VC10



Convair 880



Boeing 707



DC-8

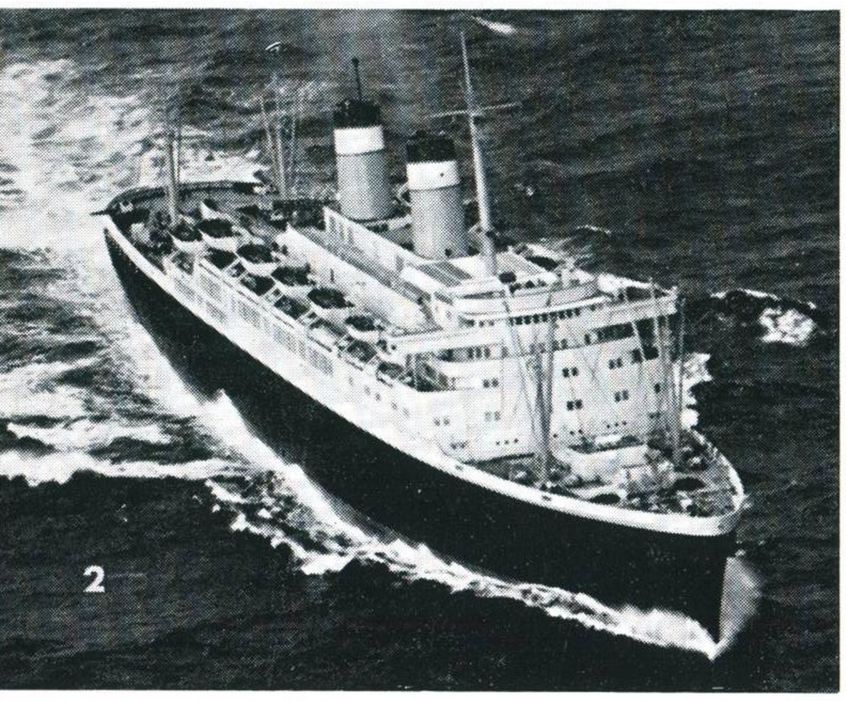


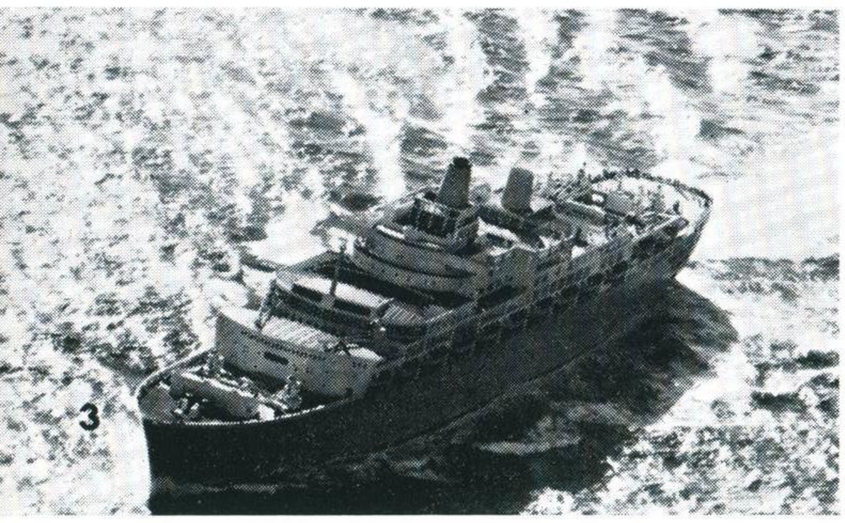
Camel

TRY THIS FOR SIZE!

As your eye runs up and down the strip of silhouette views of these passenger vessels you will begin to be aware that the proportions of the lower five are rather different from those of the first four which are liners. The lower five are more "heaped up" and "dumpy"—these are Channel packets. The proportional differences between a passenger liner and a Channel packet are thus revealed and with practice, are easy to discern instantly; the "dumpiness" usually denoting a small vessel. This lesson is designed to give you some practice at distinguishing the liner. Examine each of the target views in question and decide first of all whether you are looking at a liner or a packet. A further experience in sizing comes of making a rough assessment of the ship's length. This can be done by gauging the number of times that a lifeboat will "go into" a certain length of structure, say the superstructure or the fo'c'sle and then by plotting this piece of structure into the length of the whole vessel. Take a lifeboat as measuring between 25 and 30 feet. With a little practice this method can bring you to within 50 or 100 feet of length of large ships and will train your "eye" in sizing. This is not a matter for practice operationally, but is simply synthetic training in size appreciation. It has the advantage that the ship remains still and can be carefully examined more than once. With practice sizing becomes instinctive. A list of solutions appears on the cover and includes length, gross tonnage etc. and details of the reporting code which should be practised as a third and separate lesson. For data on the reporting code see the October 1964 Edition of the *Journal*.


1

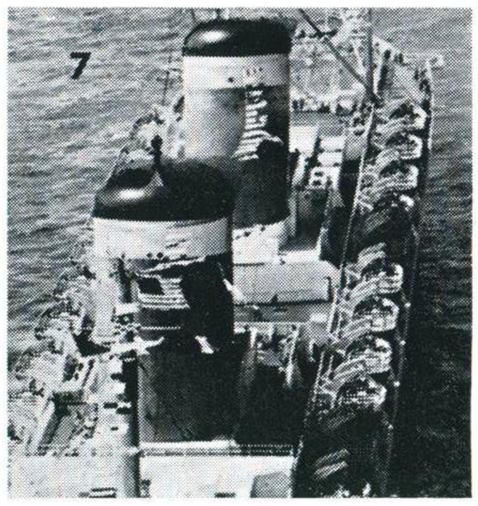

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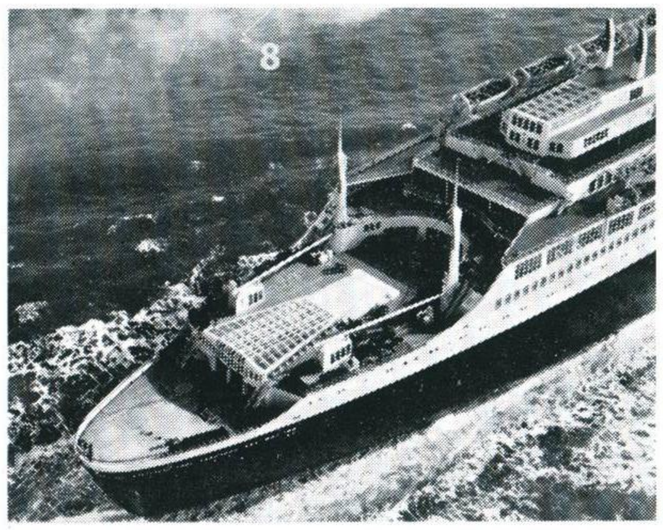

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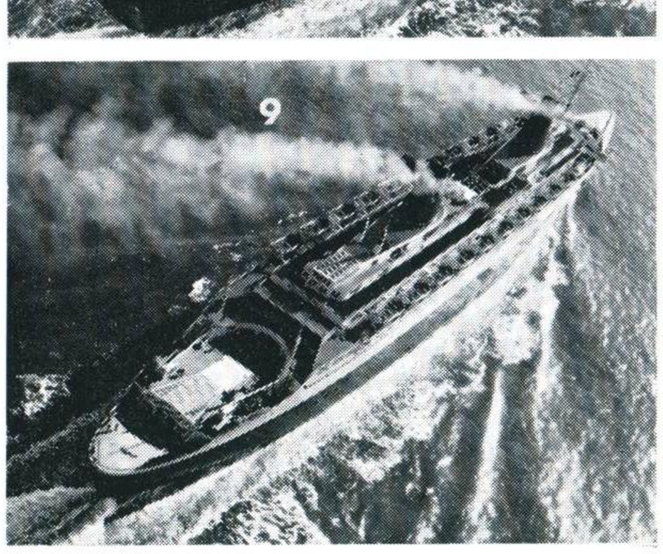

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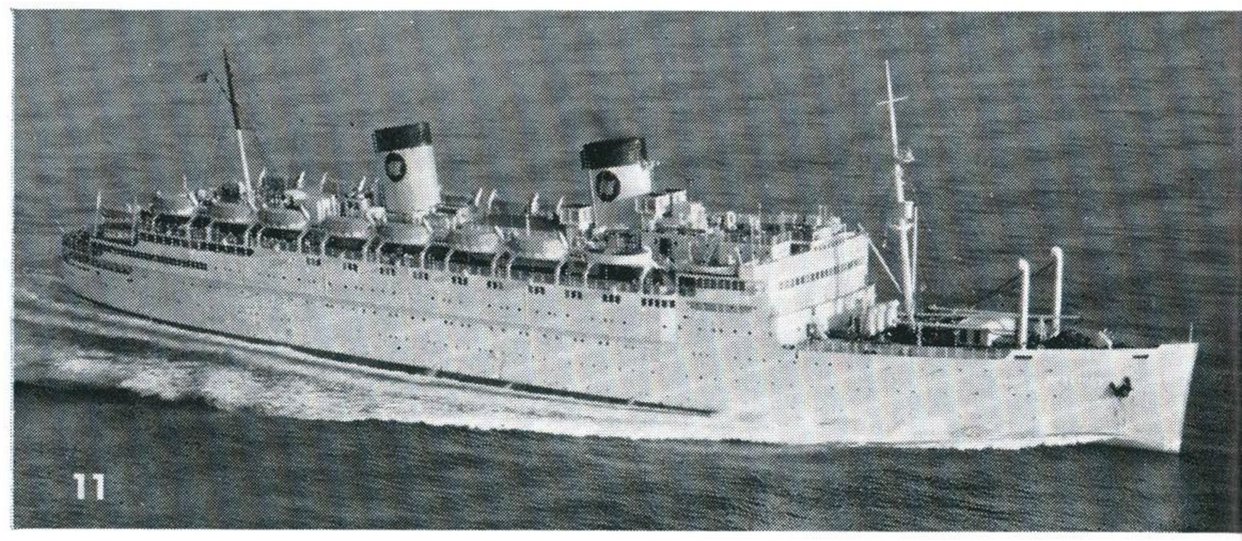

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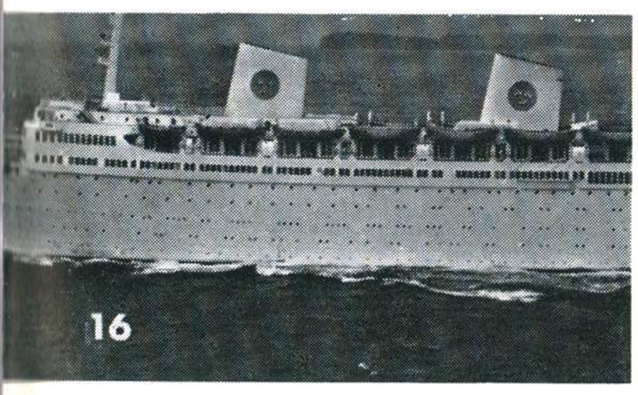

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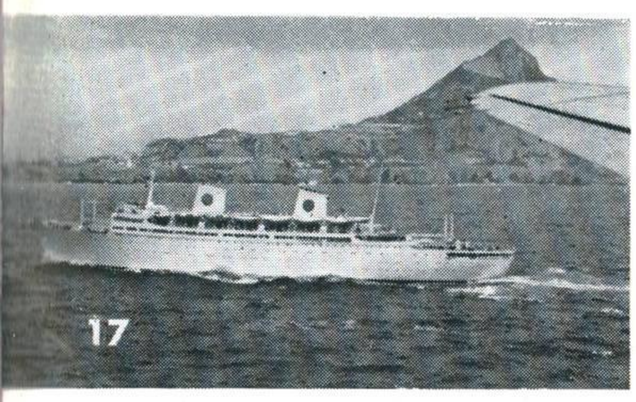

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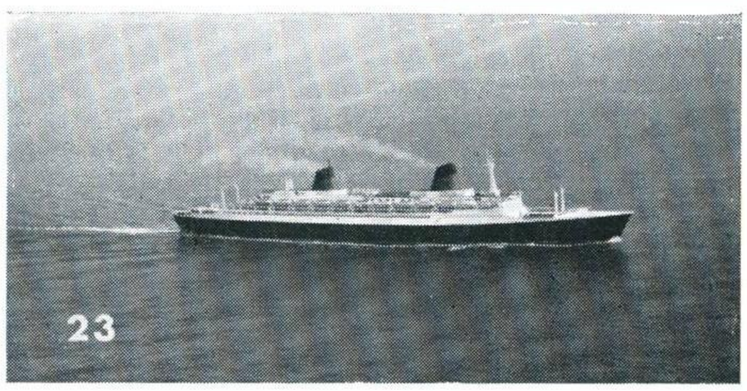

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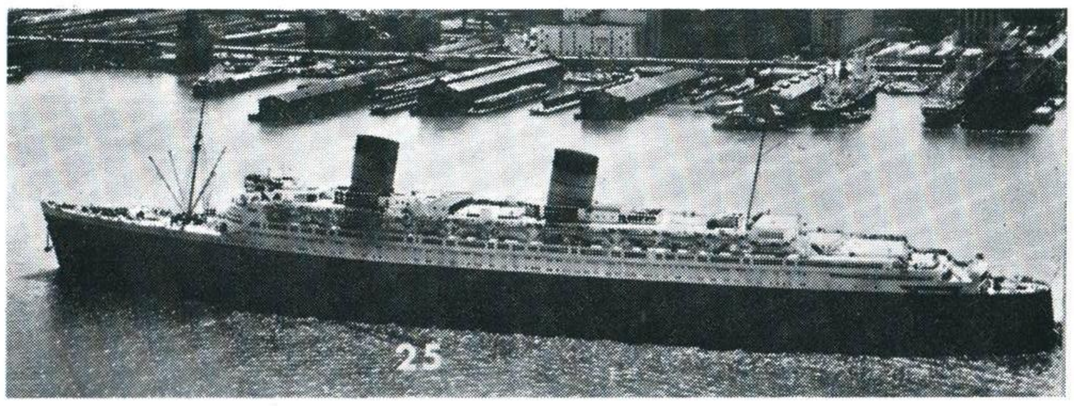

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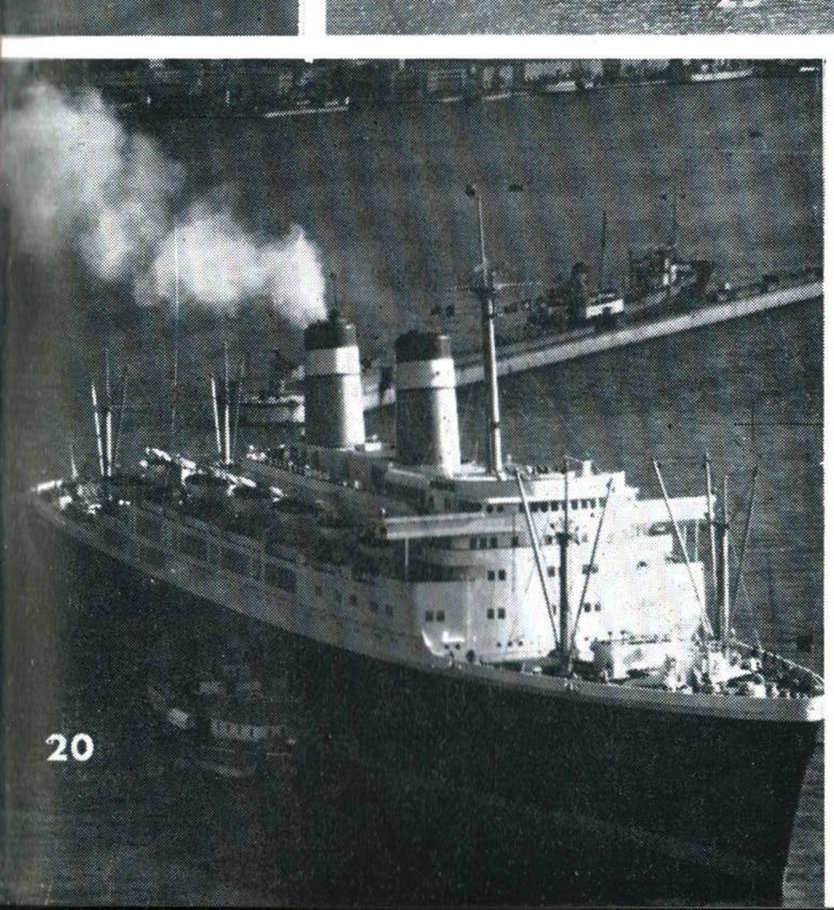

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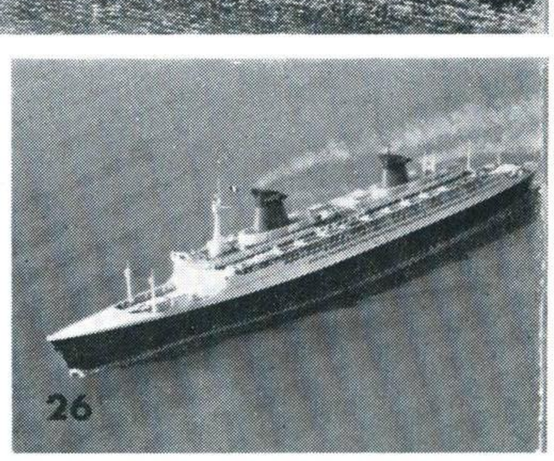

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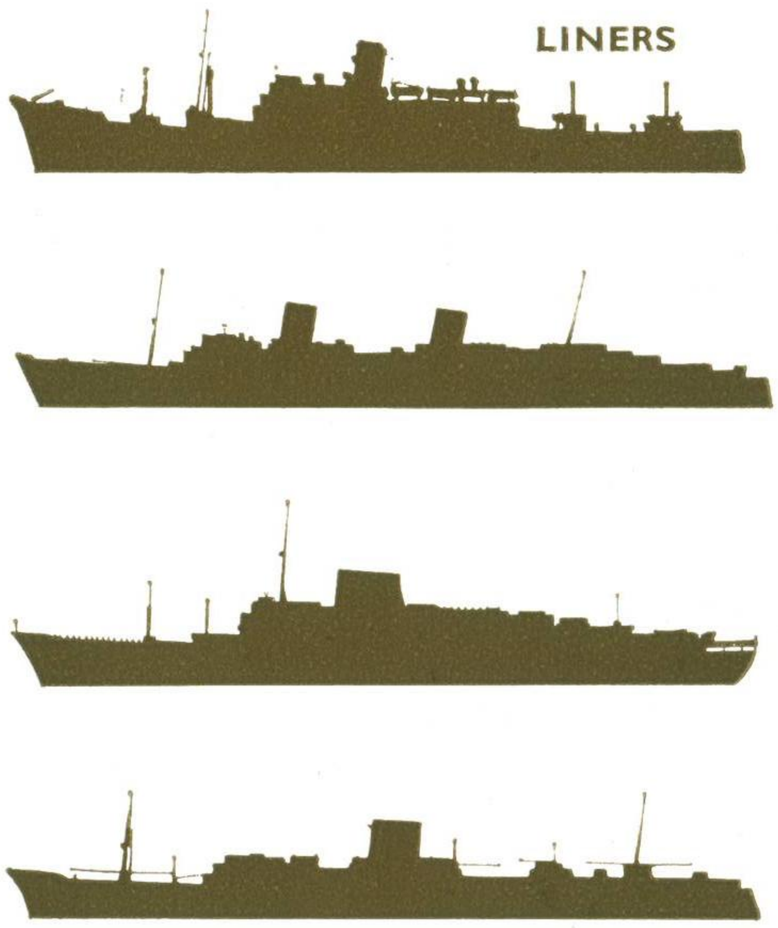

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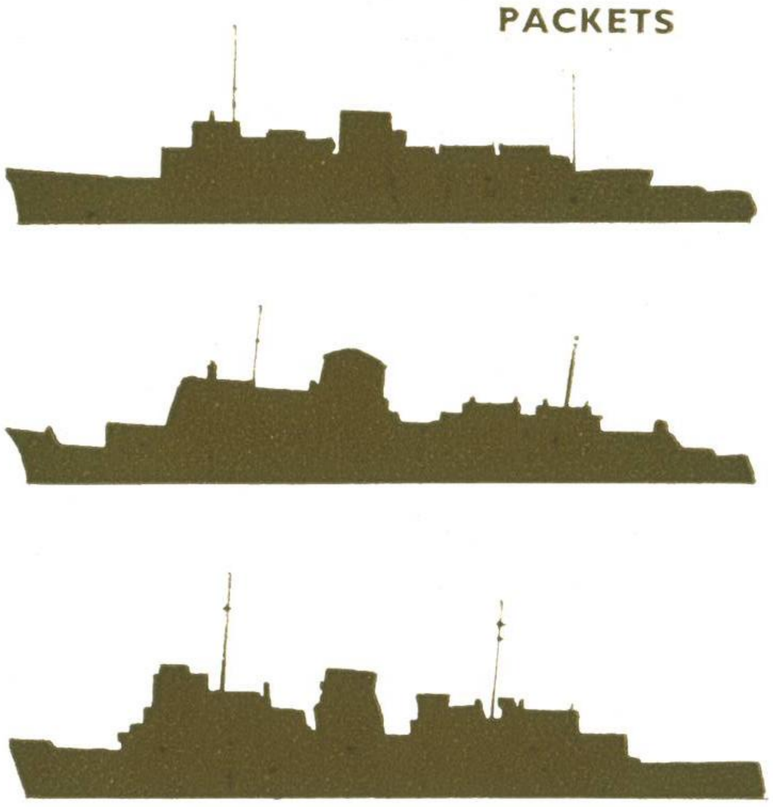
CHARACTERISTIC SILHOUETTES

The silhouette is the key to a ship's visual characteristics, its function and its size; you can gain experience of these things by using the silhouettes with the photographs.

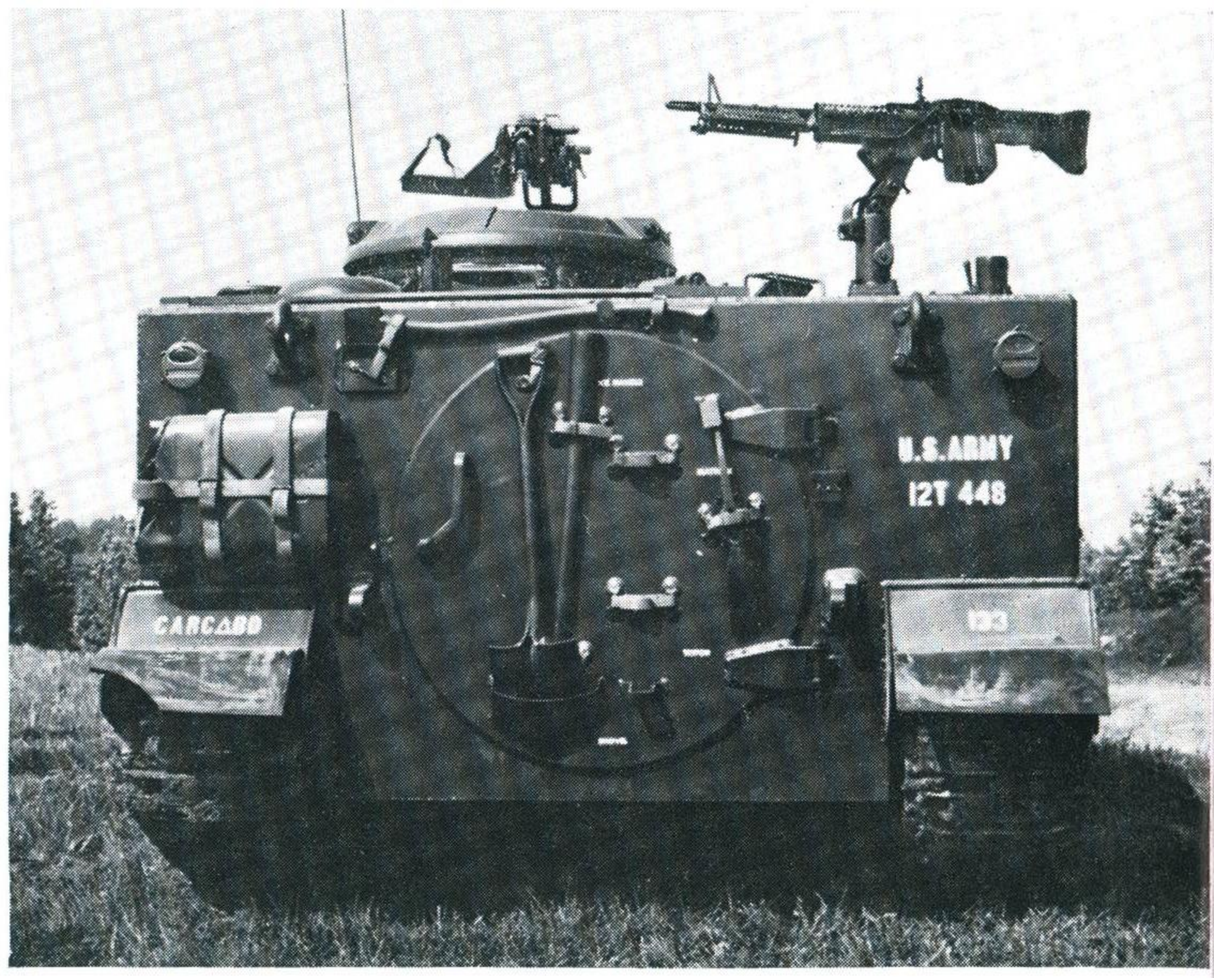
LINERS



PACKETS



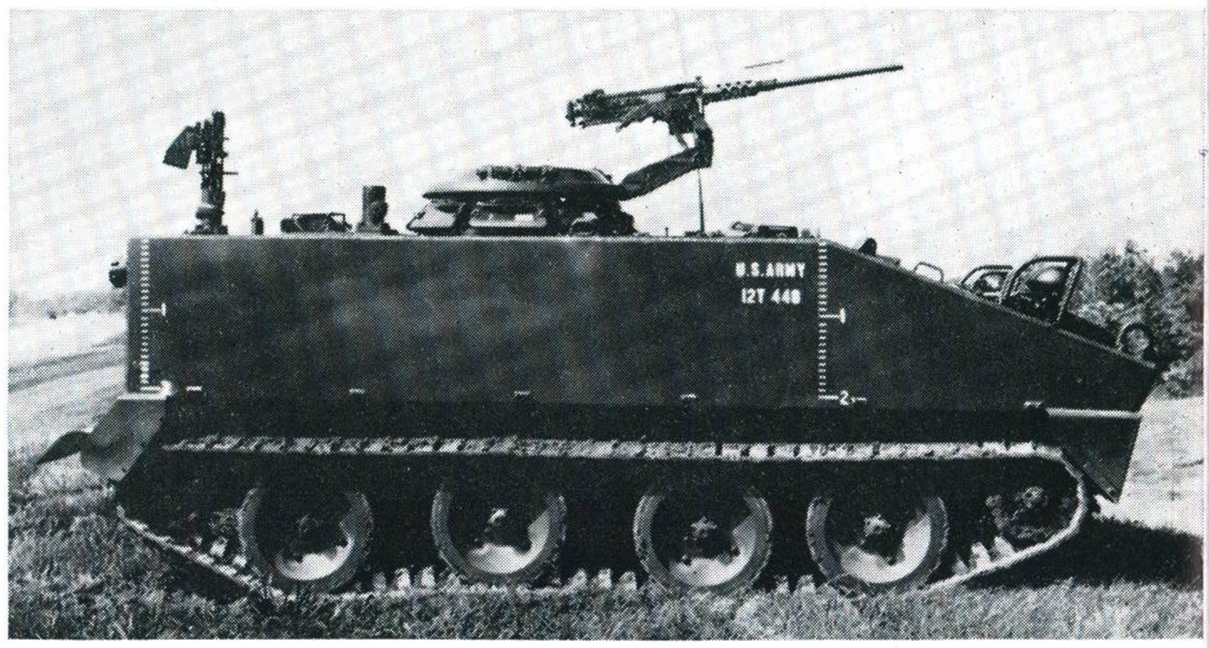




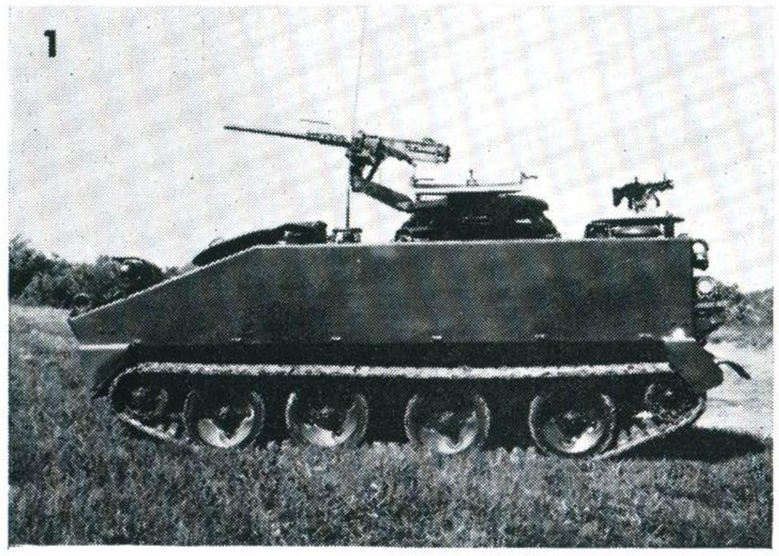
U.S. M114

Command and Reconnaissance Vehicle

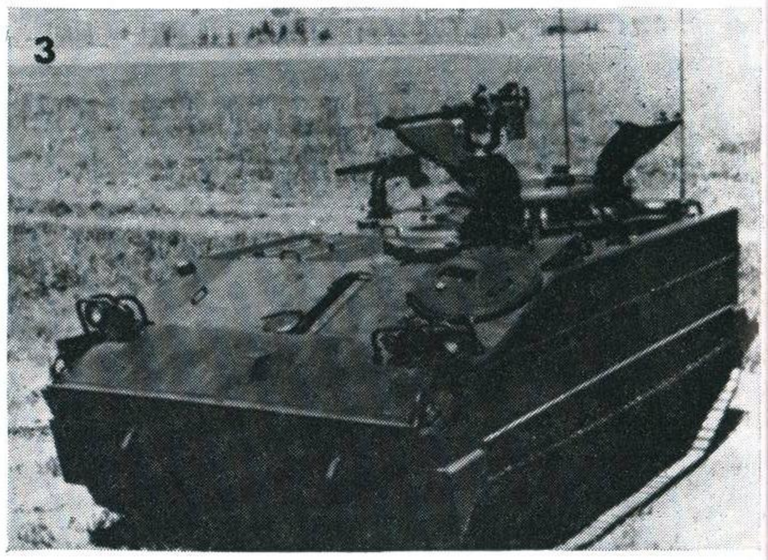
At first sight the United States M114 Command and Reconnaissance Vehicle might appear to be a smaller edition of the U.S. M113 or British F.V.432 armoured personnel carriers. In fact, its functions are quite different—as its name indicates. Lesson instructions on page 139 and background information on page 136.

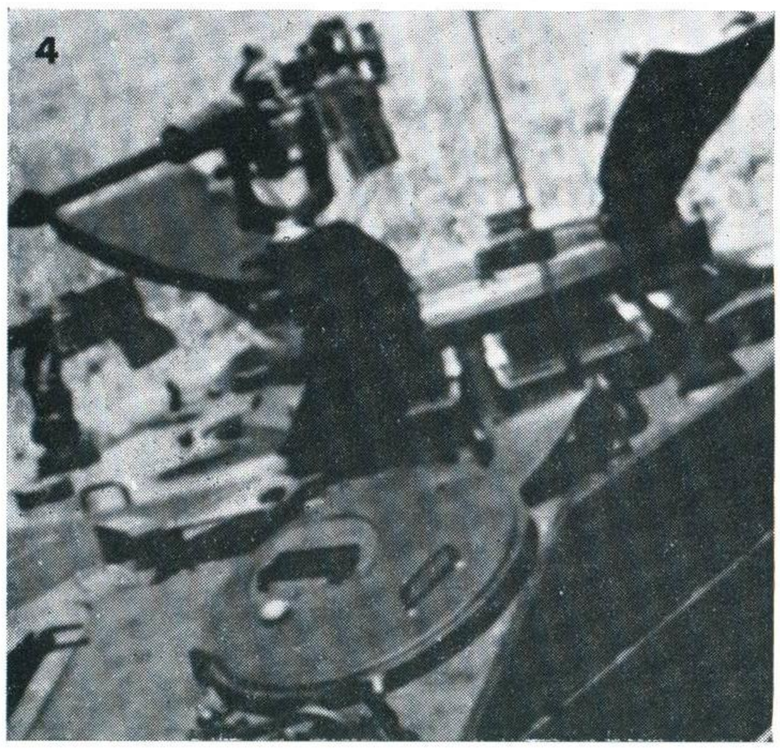


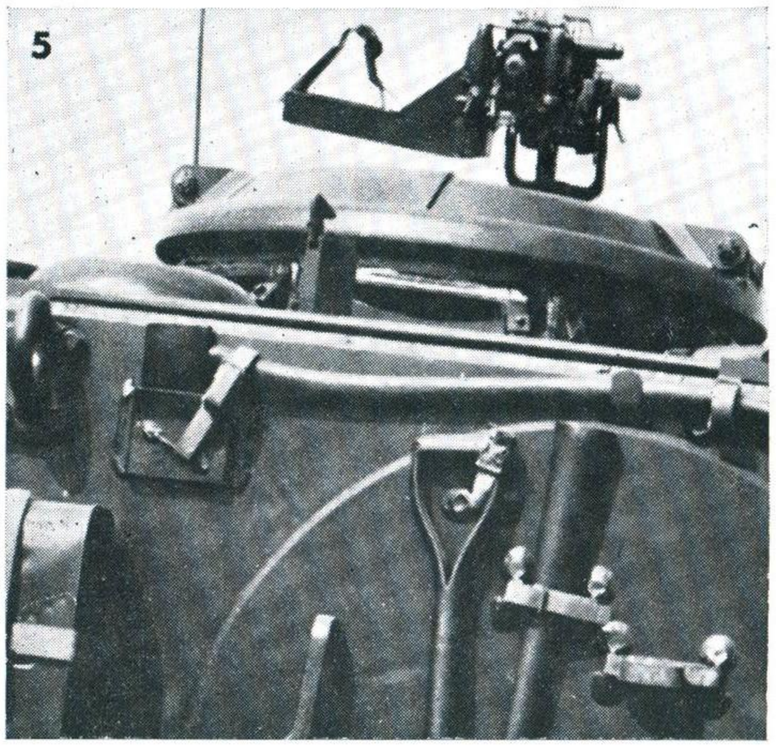
Coloured line divides keys from targets

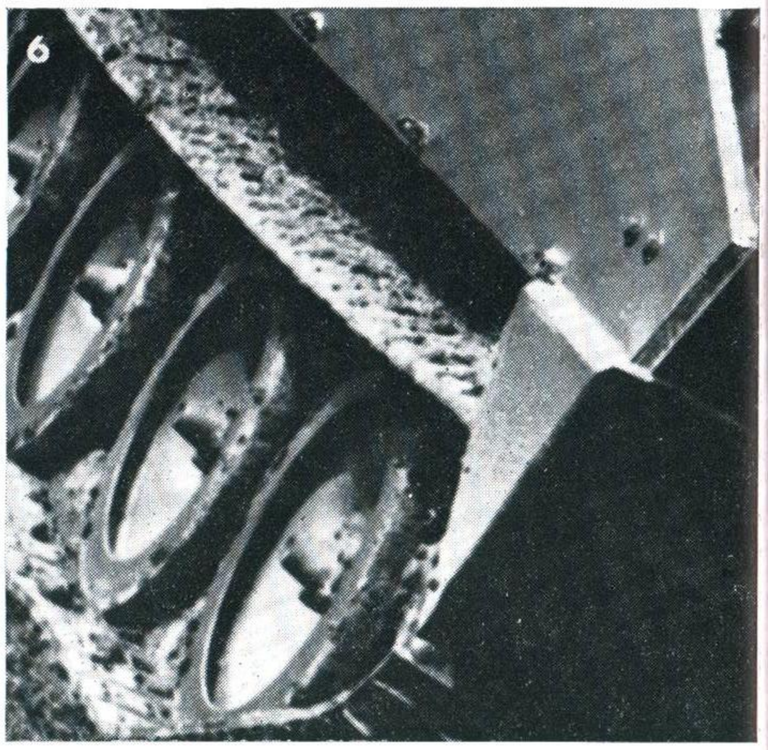


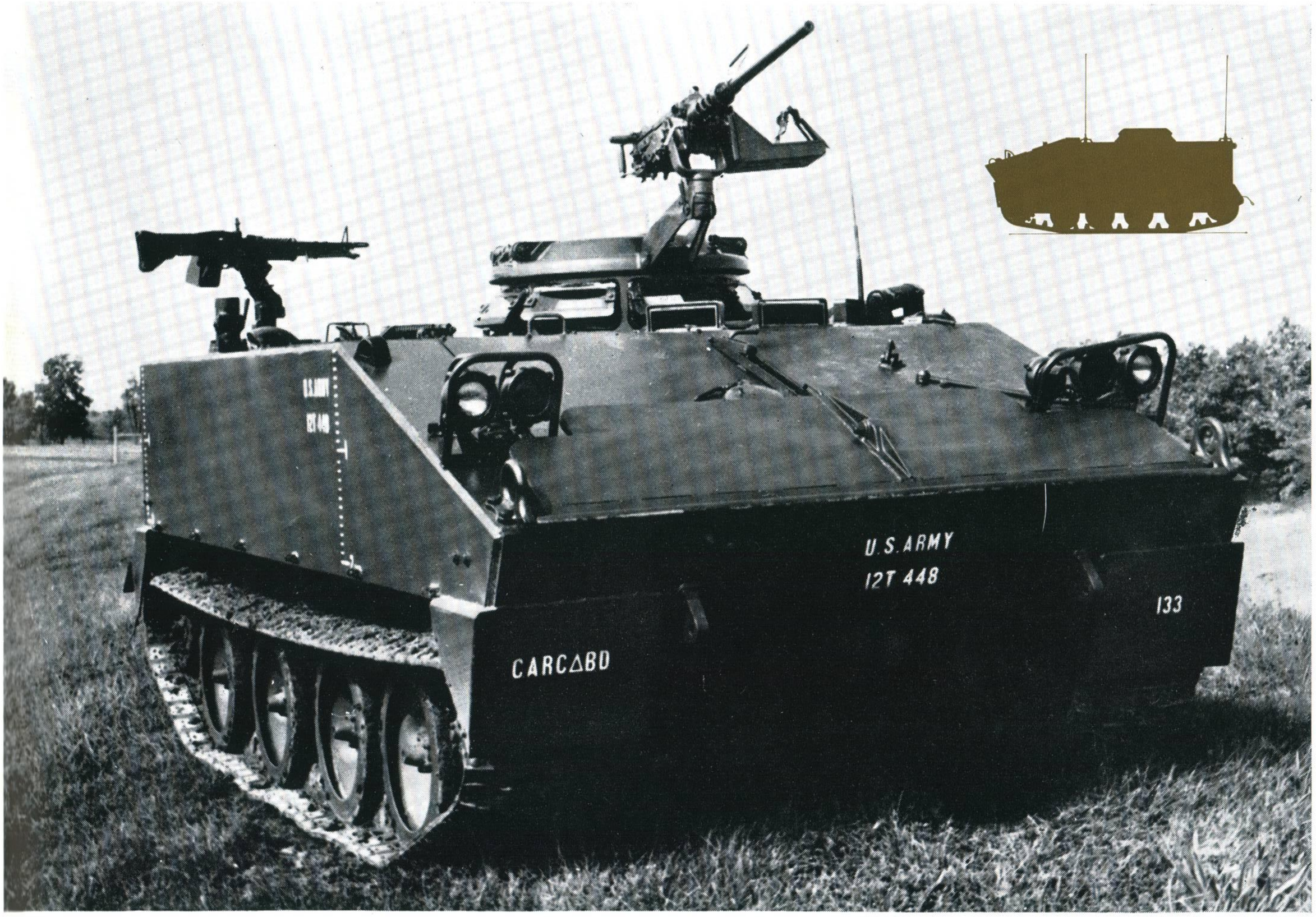




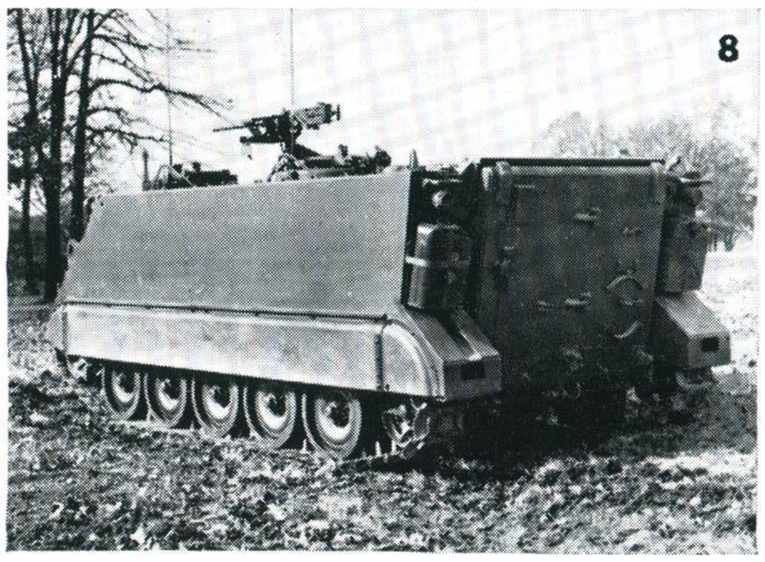




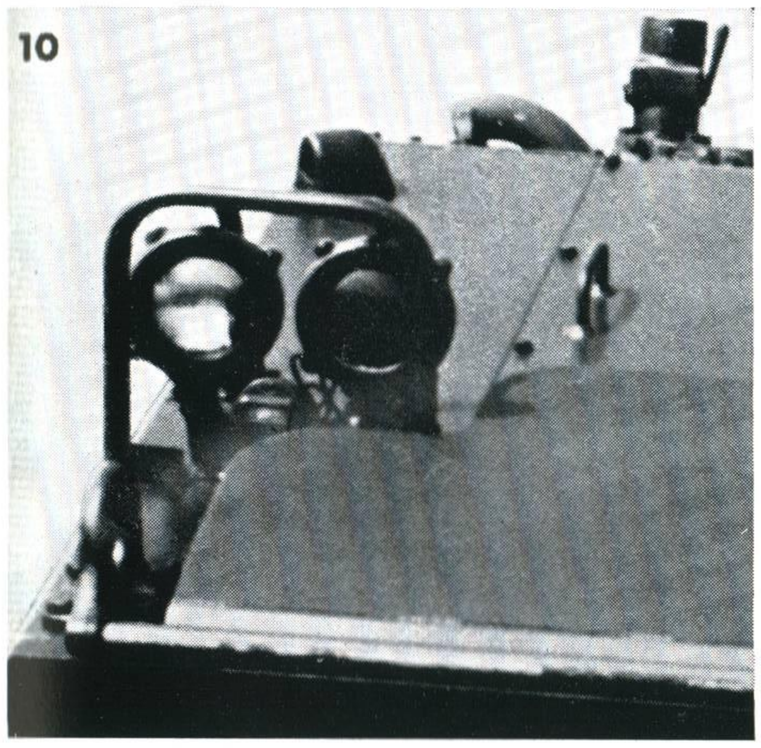


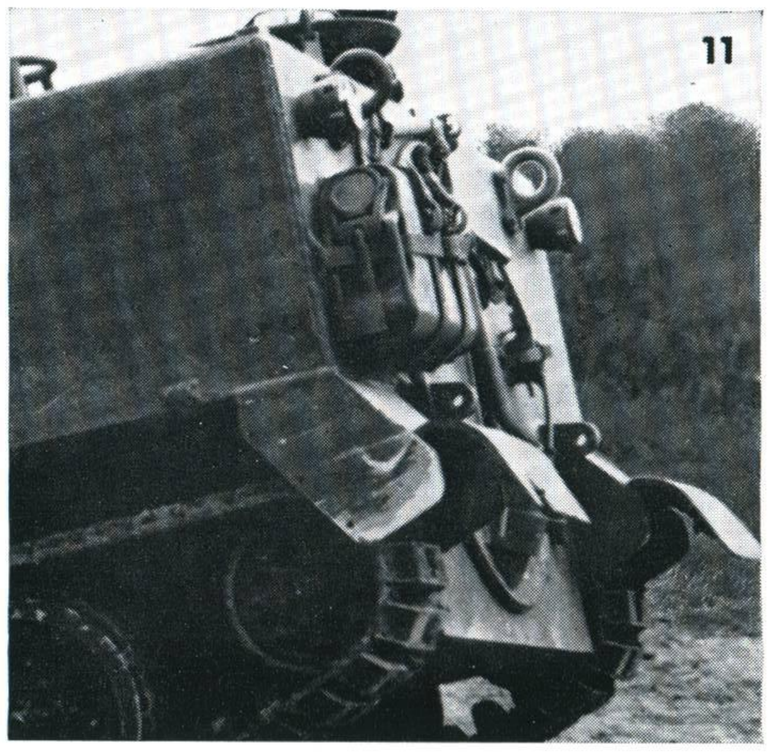


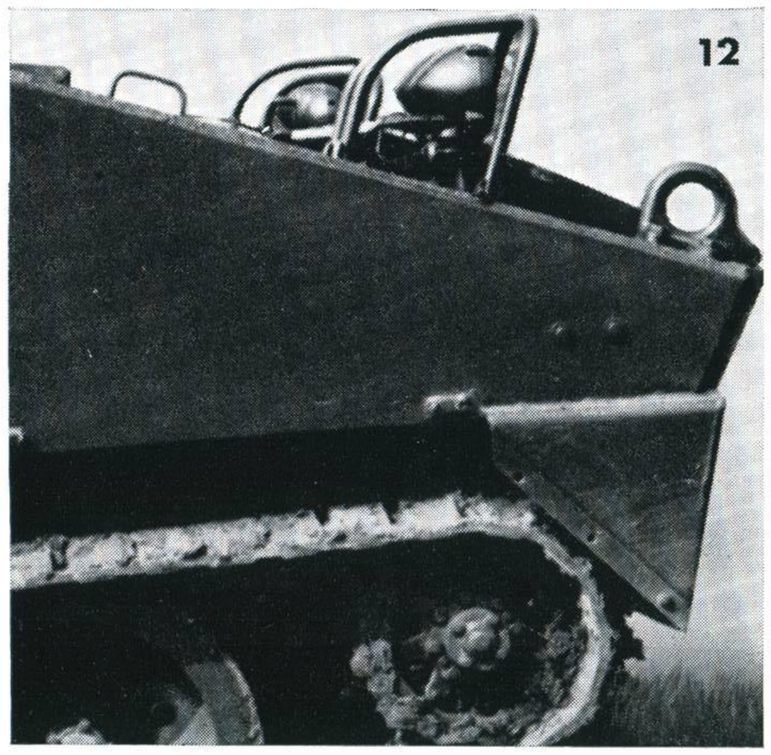




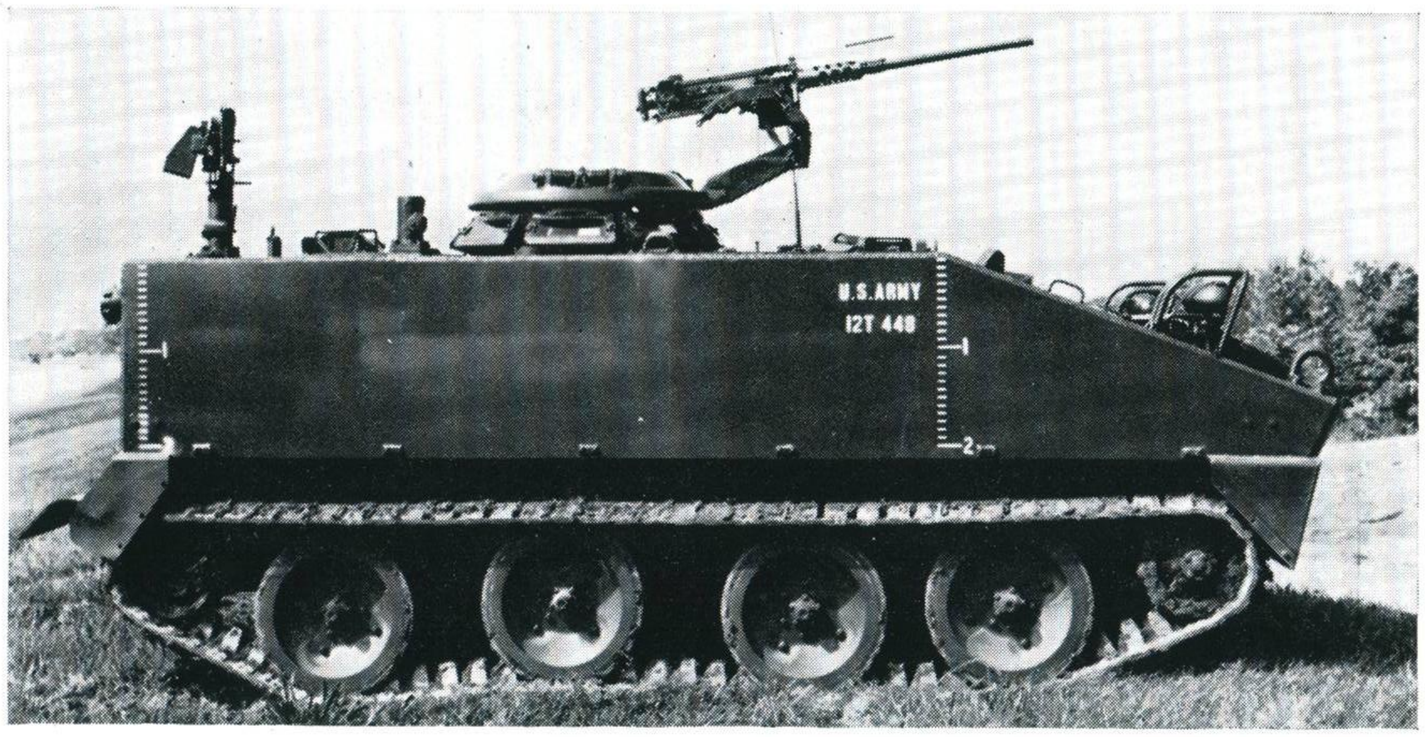








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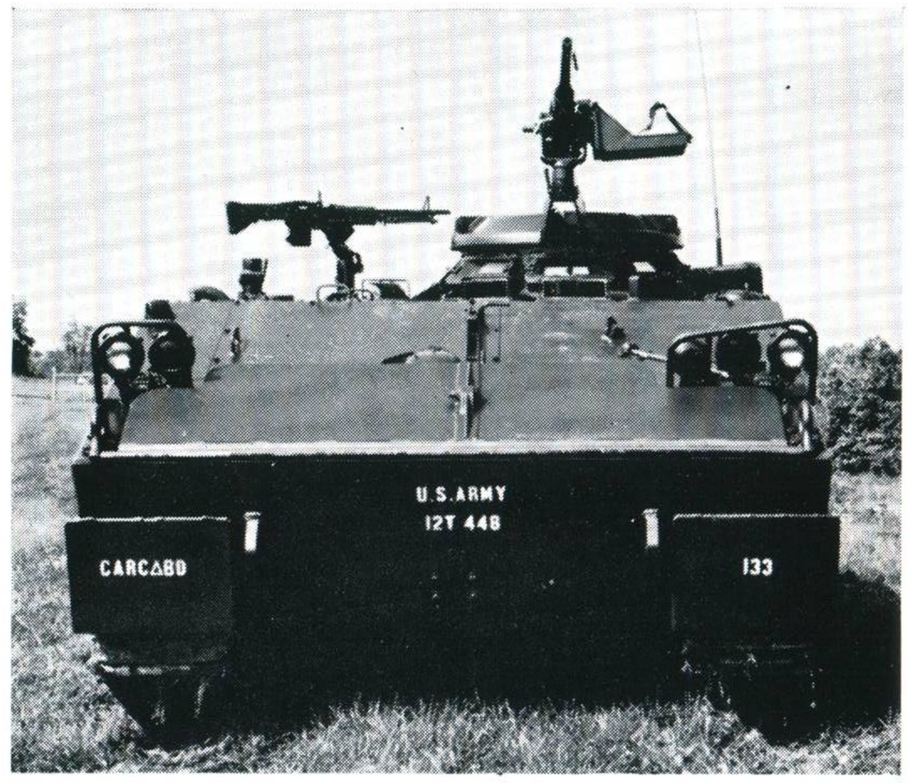
U.S. M114 COMMAND AND RECONNAISSANCE VEHICLE

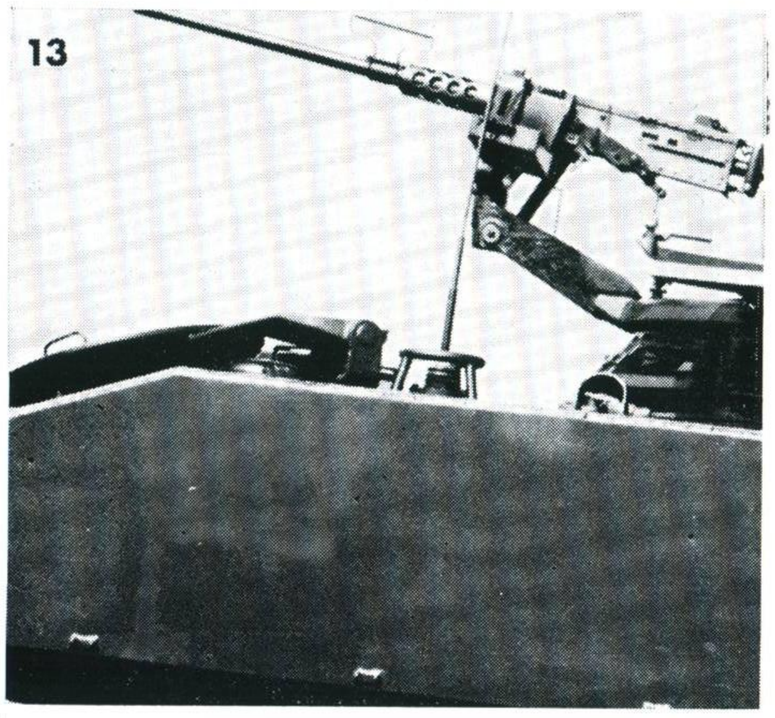
The M114's closest equivalent in British Service is the Ferret scout car. Compared with the latter the M114 has the advantage of being amphibious, so that it can cross inland water obstacles without preparation paddling itself across by means of its tracks. At 7 tons all up weight it is, however, considerably heavier than the Ferret, noisier and less mobile on hard going.

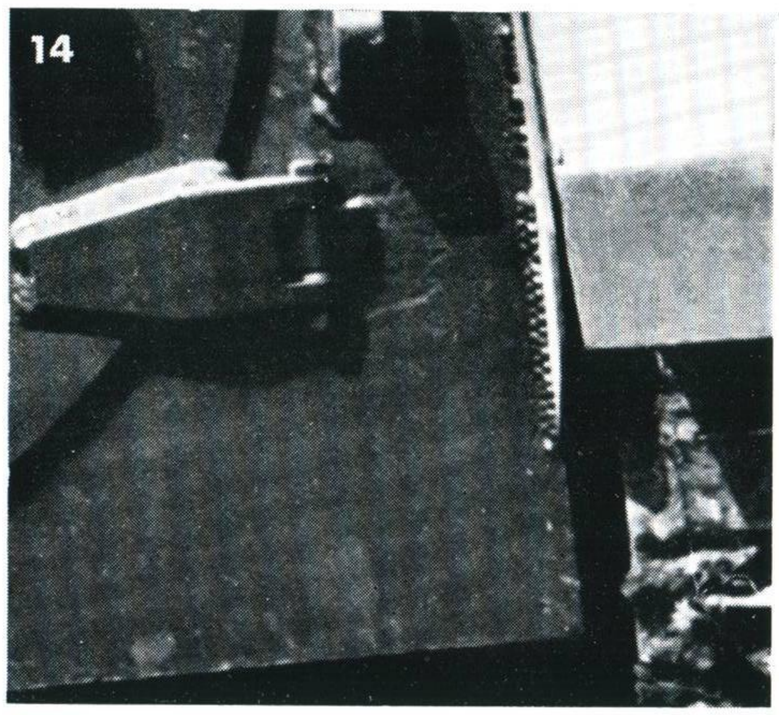
There are now two slightly different versions of the vehicle, the original M114 and the more recent M114A1. On the latter the commander's cupola is less bulky and the ·50-in. machine gun mounted on it is lower than on the original model. Both versions also have an externally mounted 7·62-mm. machine gun operated by the third member of the vehicle's three-man crew.

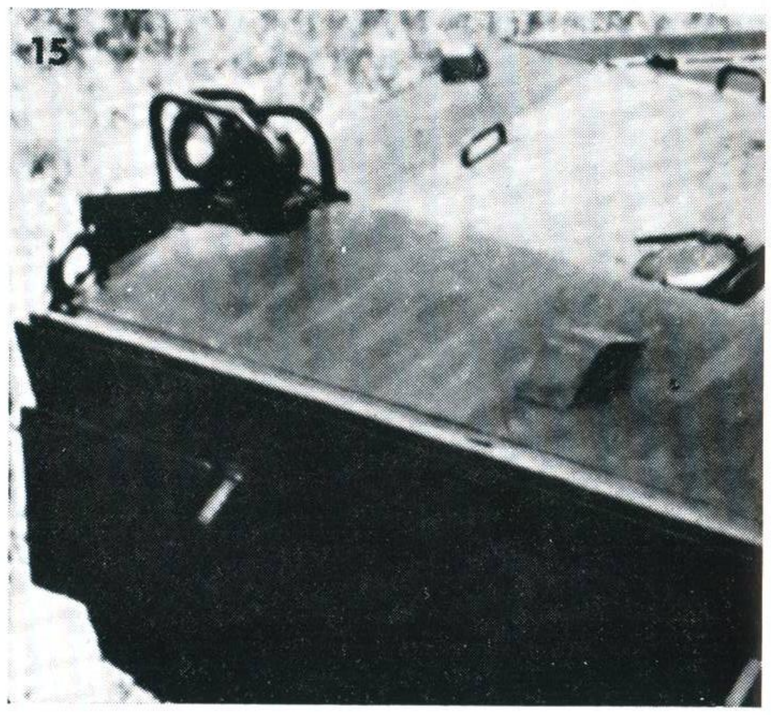
Apart from being smaller, features which distinguish the M114 from armoured personnel carriers of the M113 type are its four road wheels per side, the absence of track shrouds and a large circular rear door.

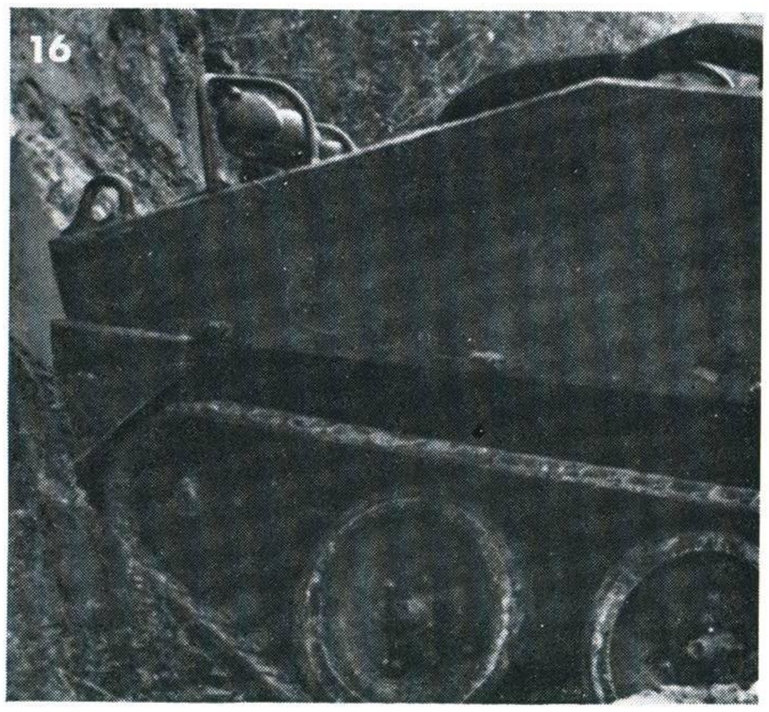
Solutions on cover.

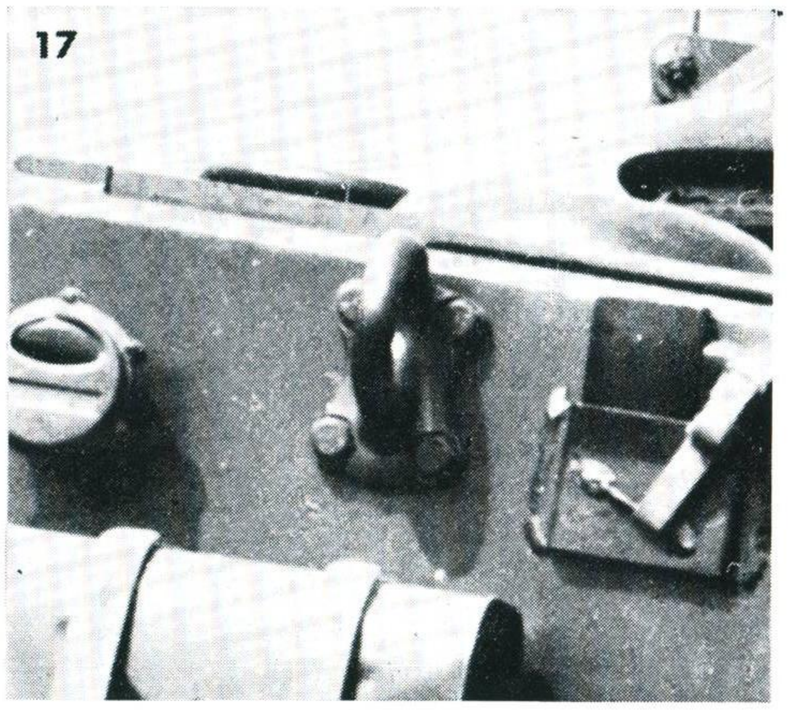


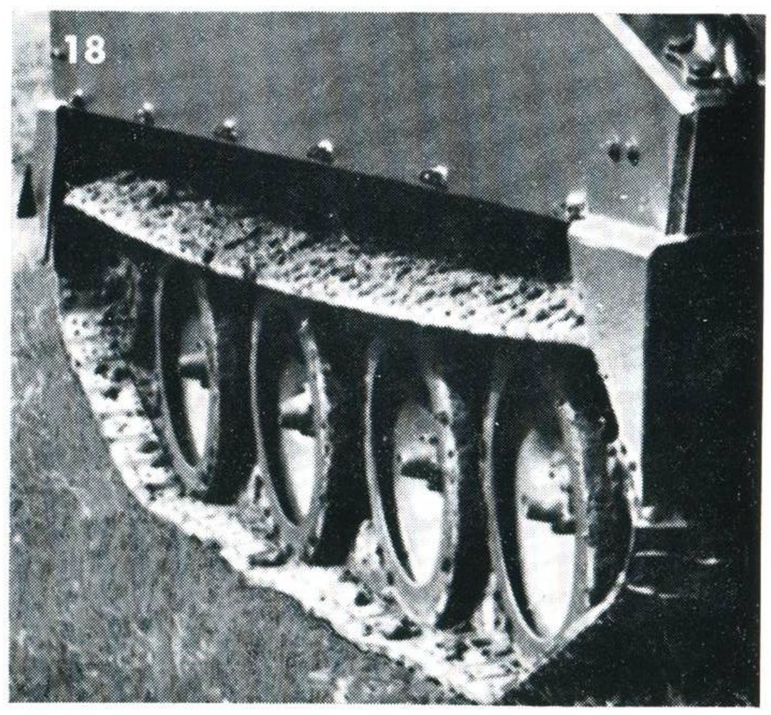


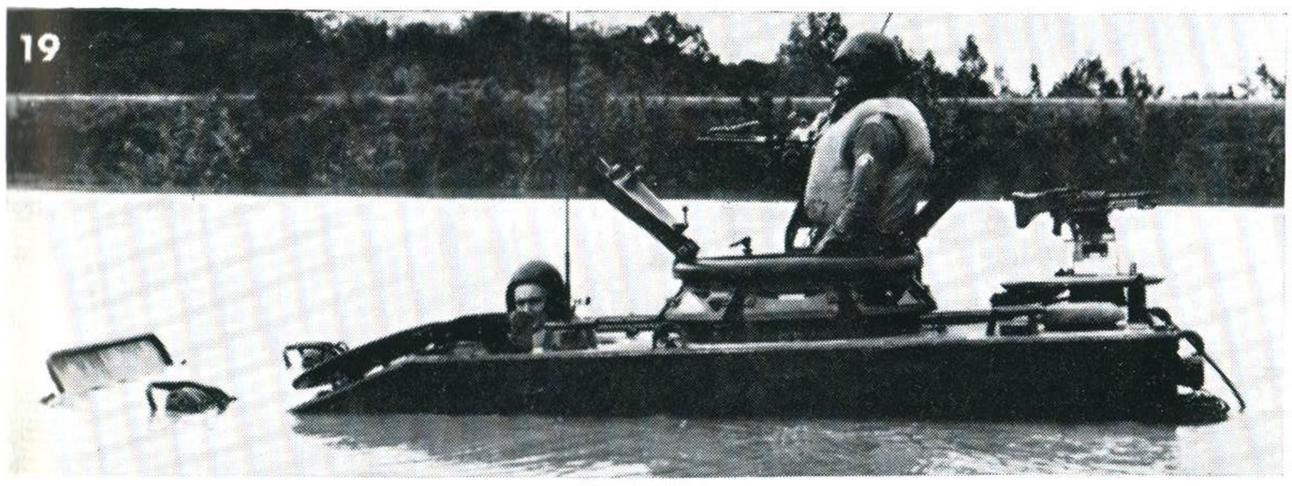


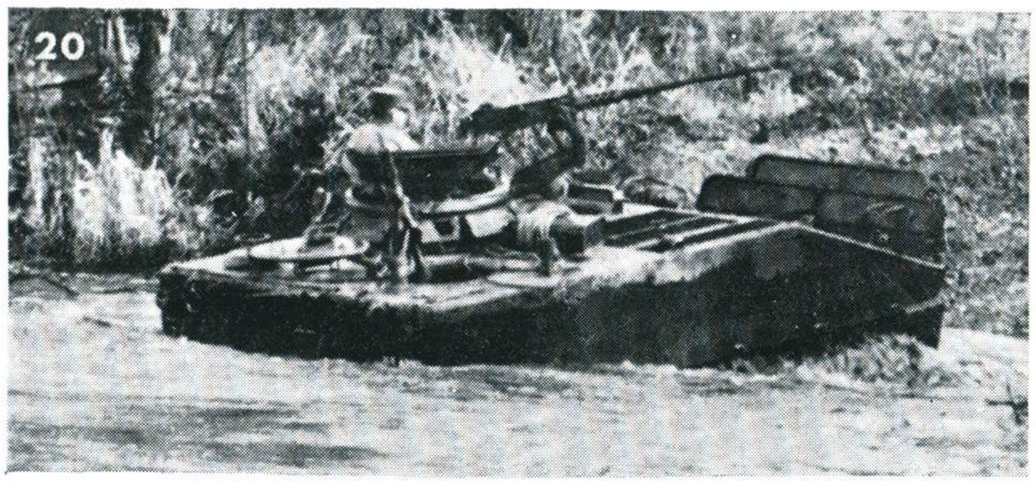




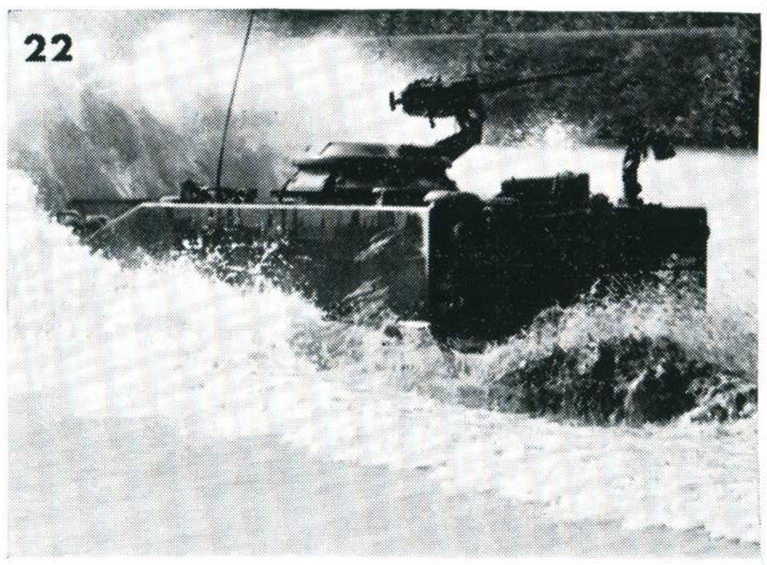




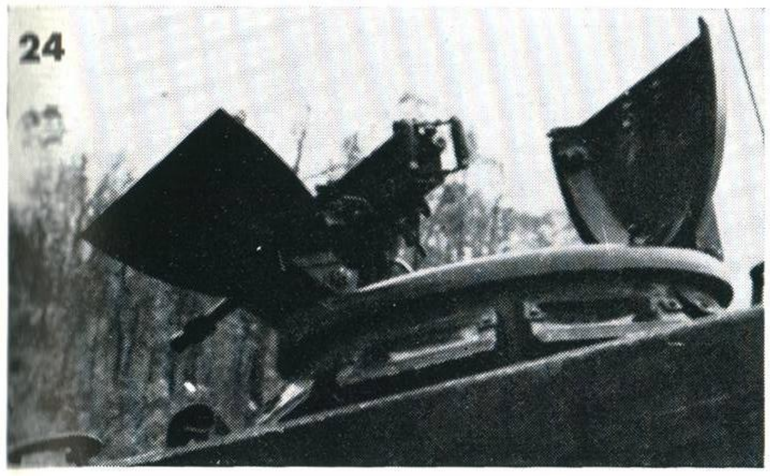

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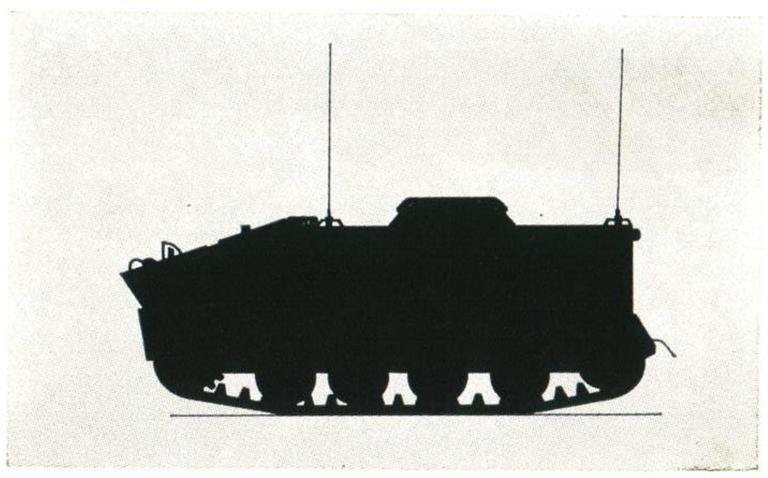

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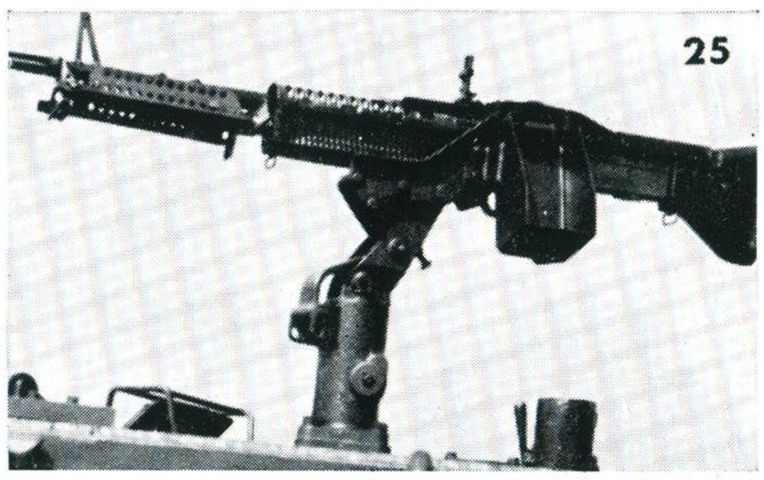

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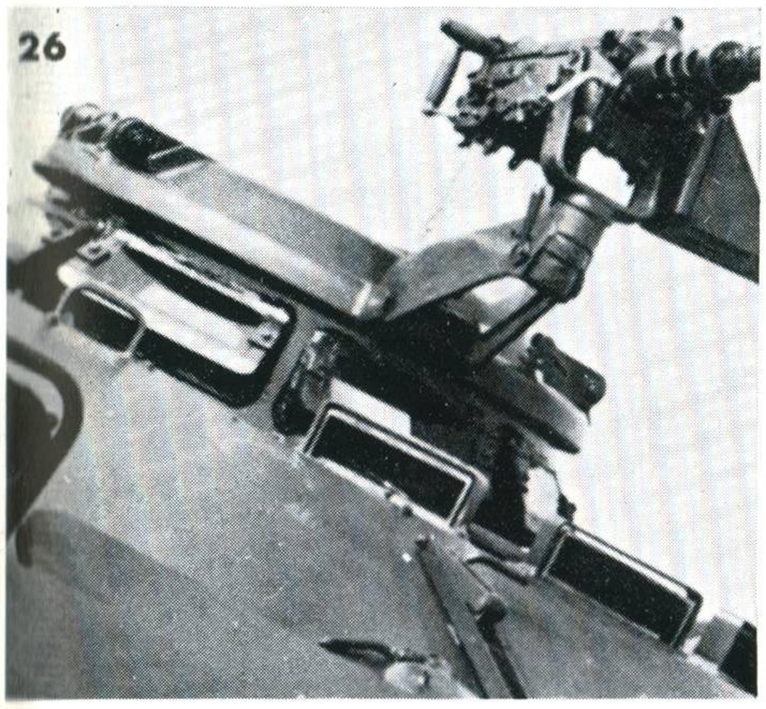

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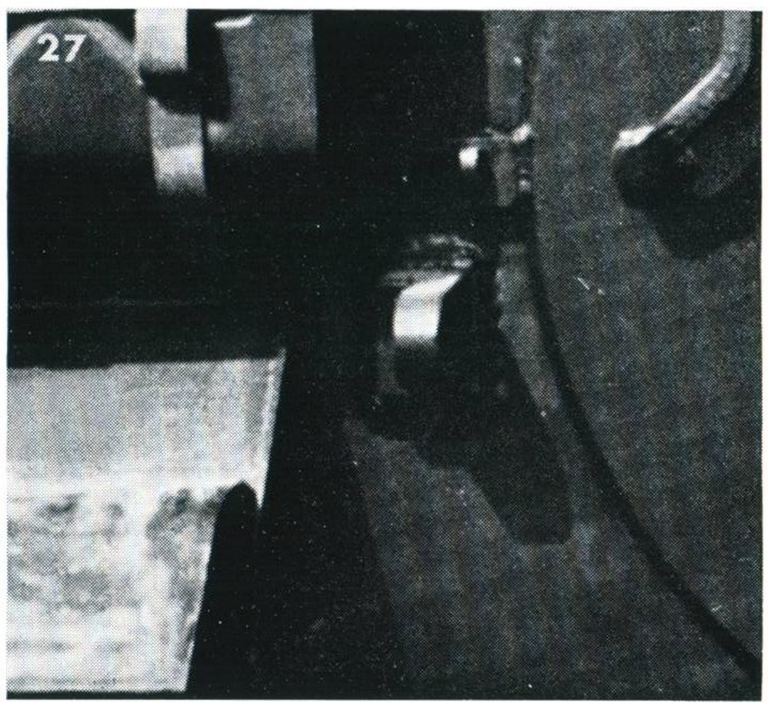

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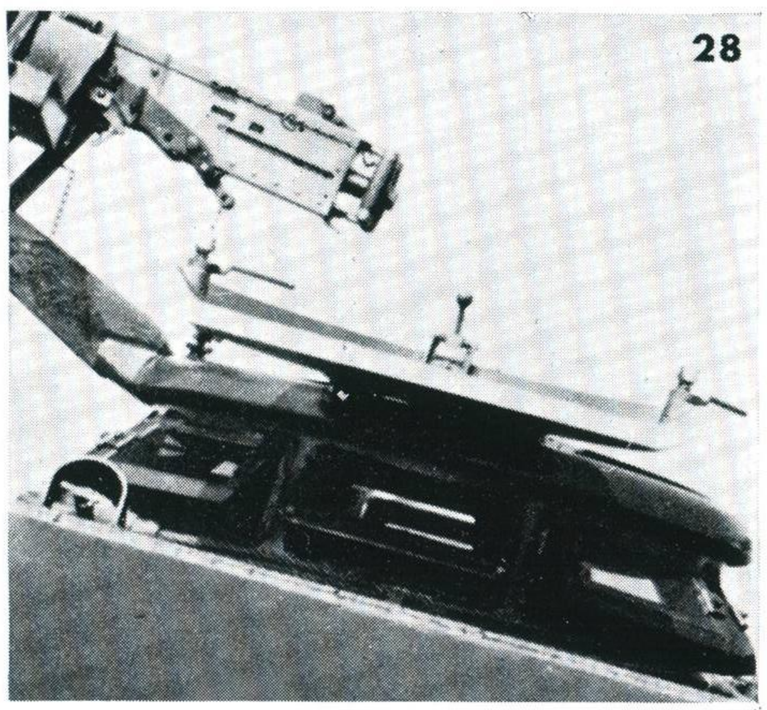

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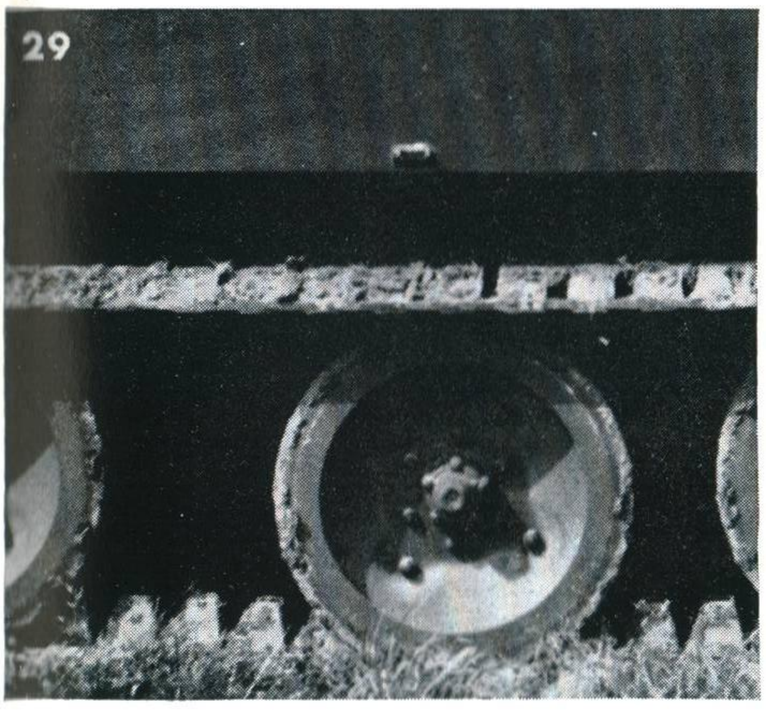


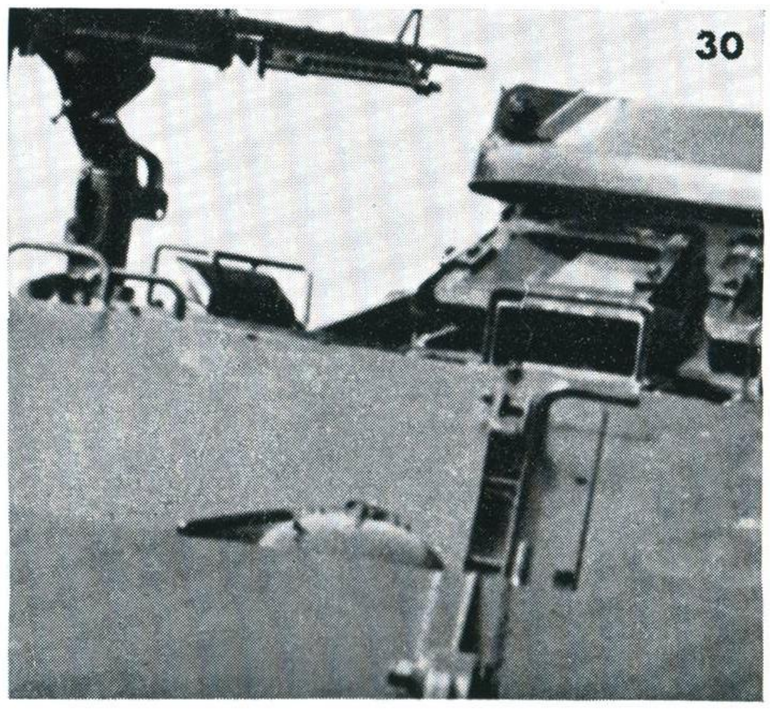

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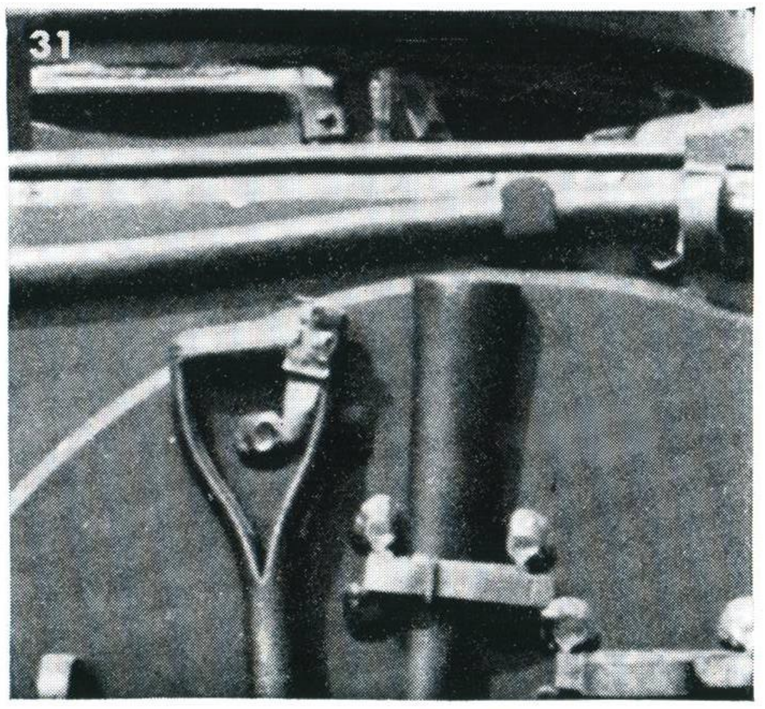

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M114





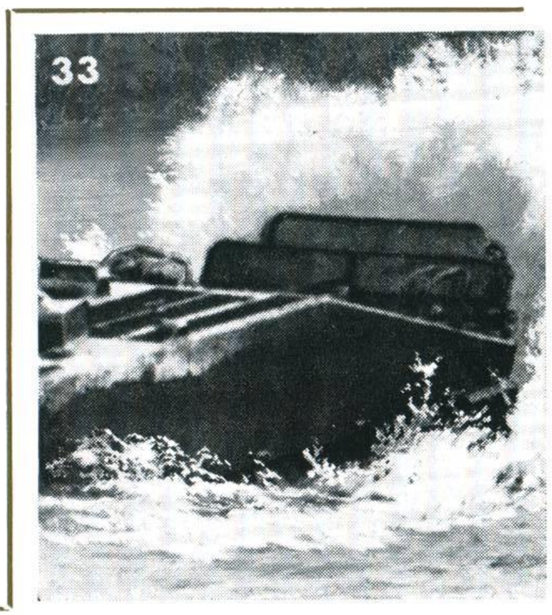


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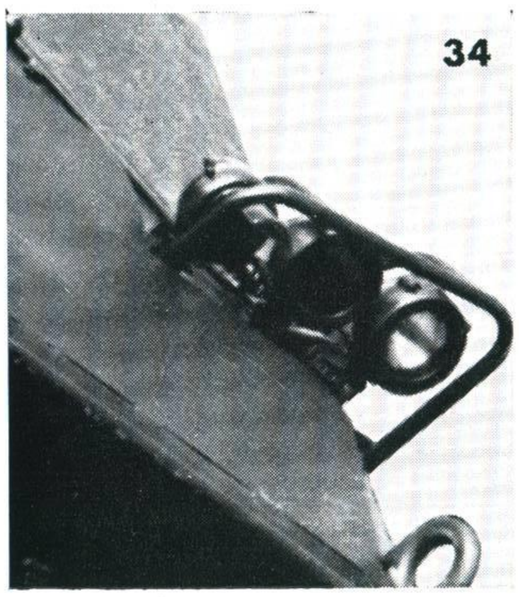




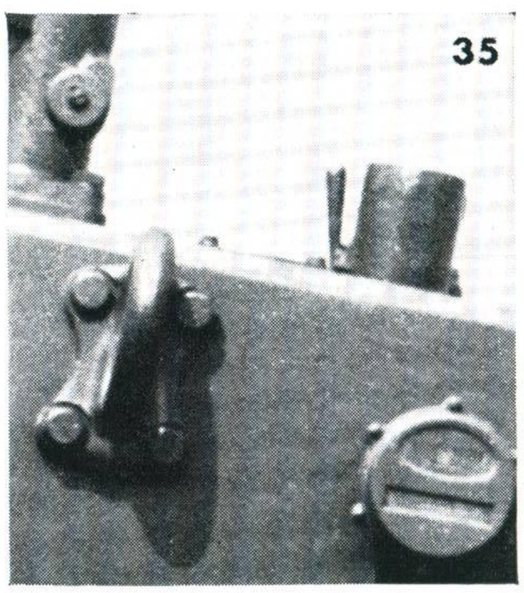
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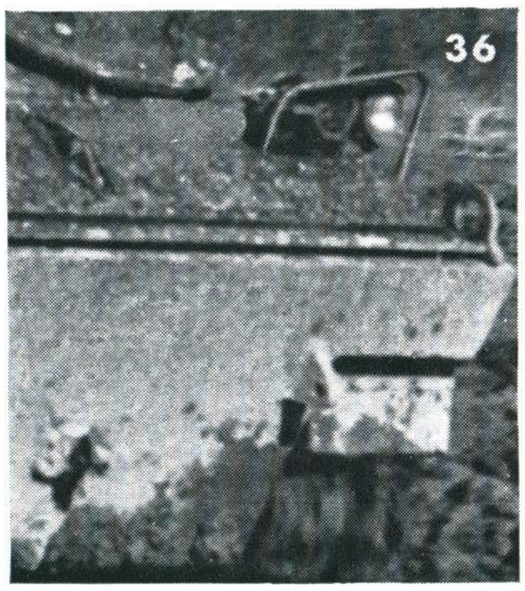
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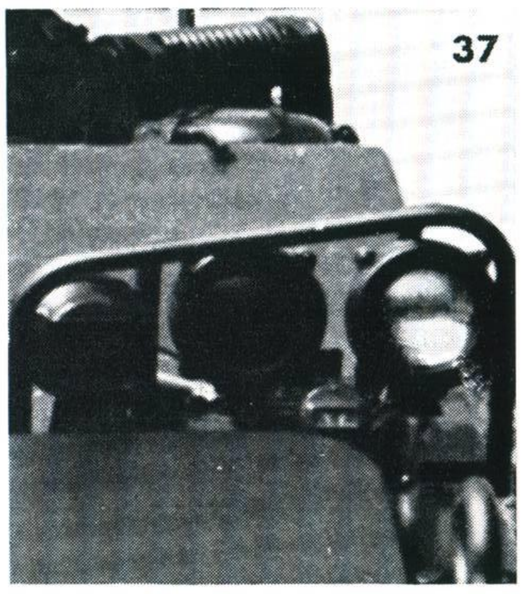
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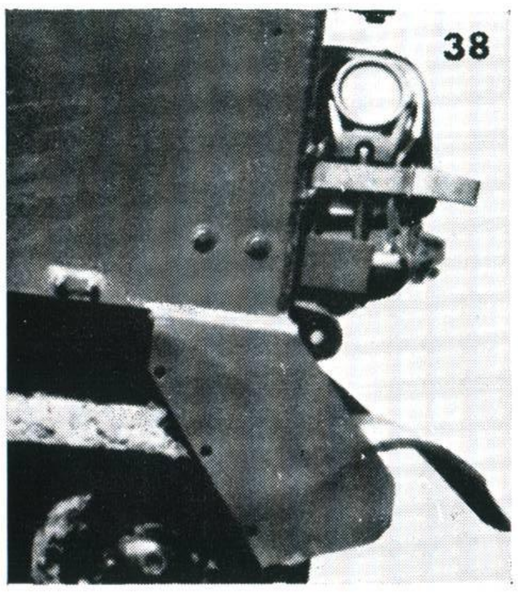
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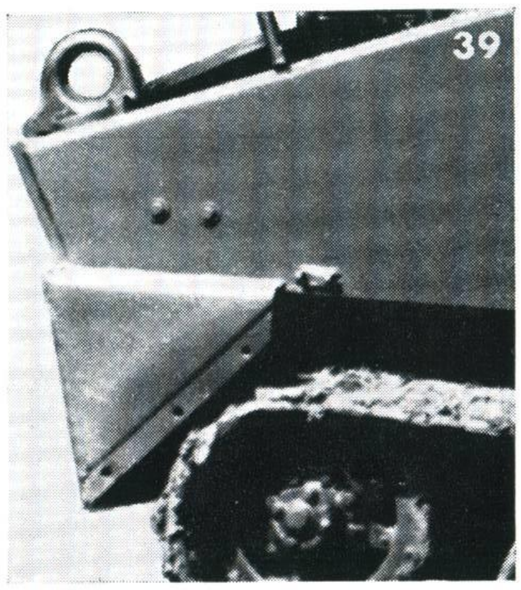
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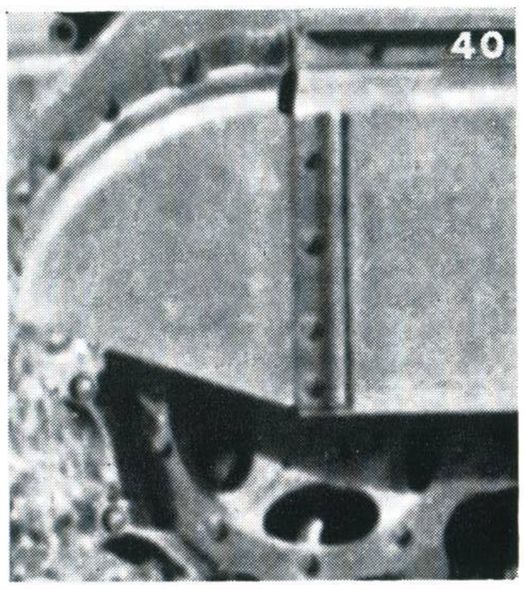
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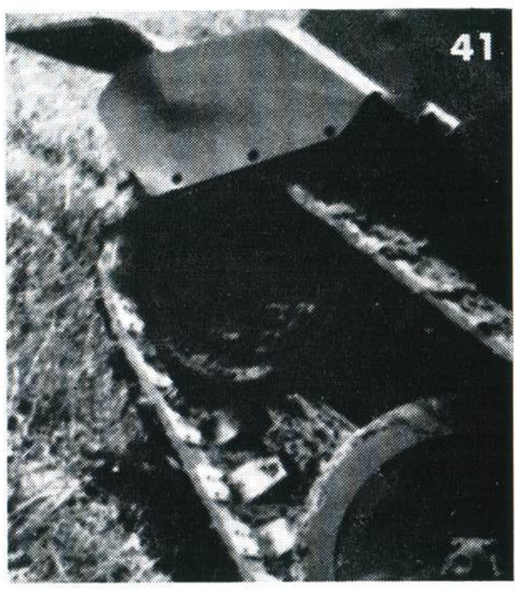
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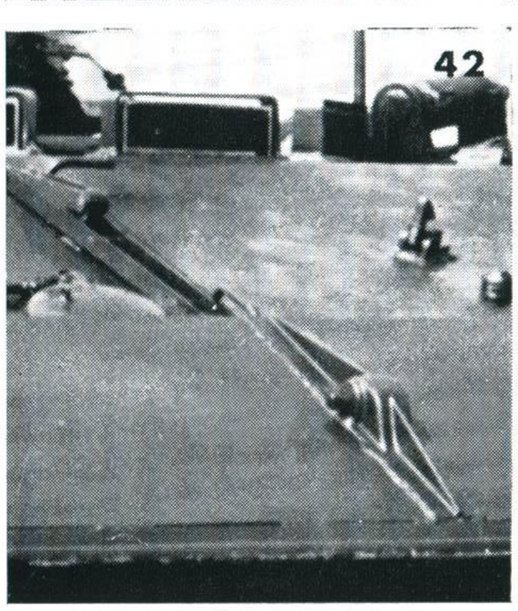
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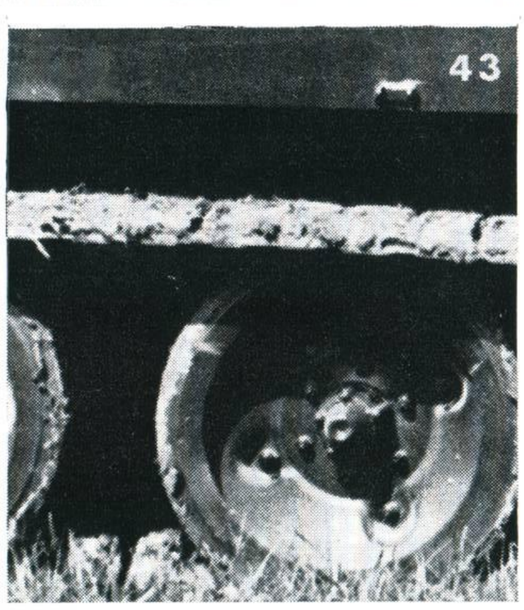
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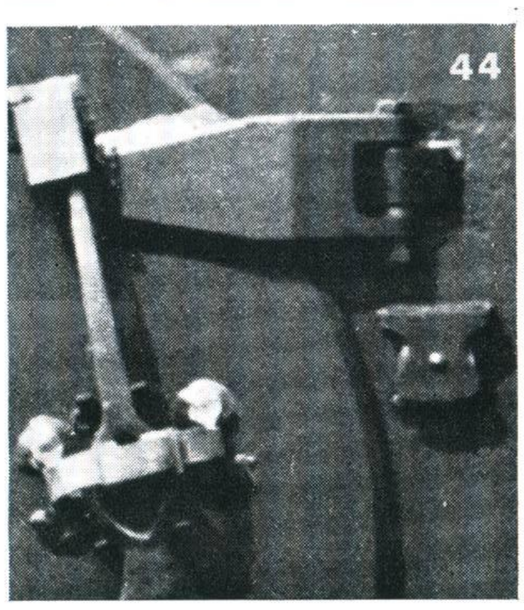
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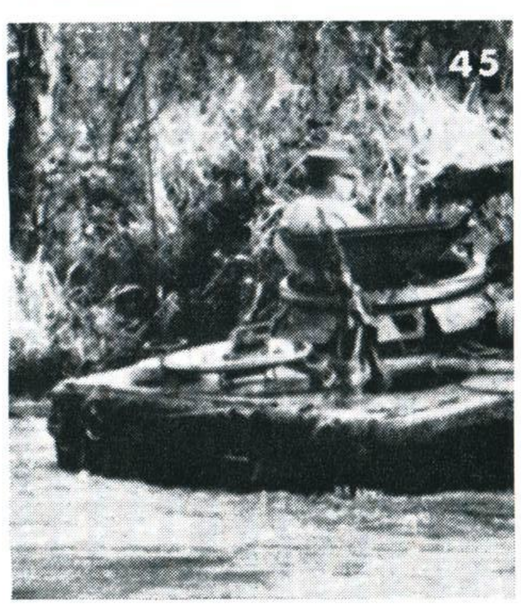
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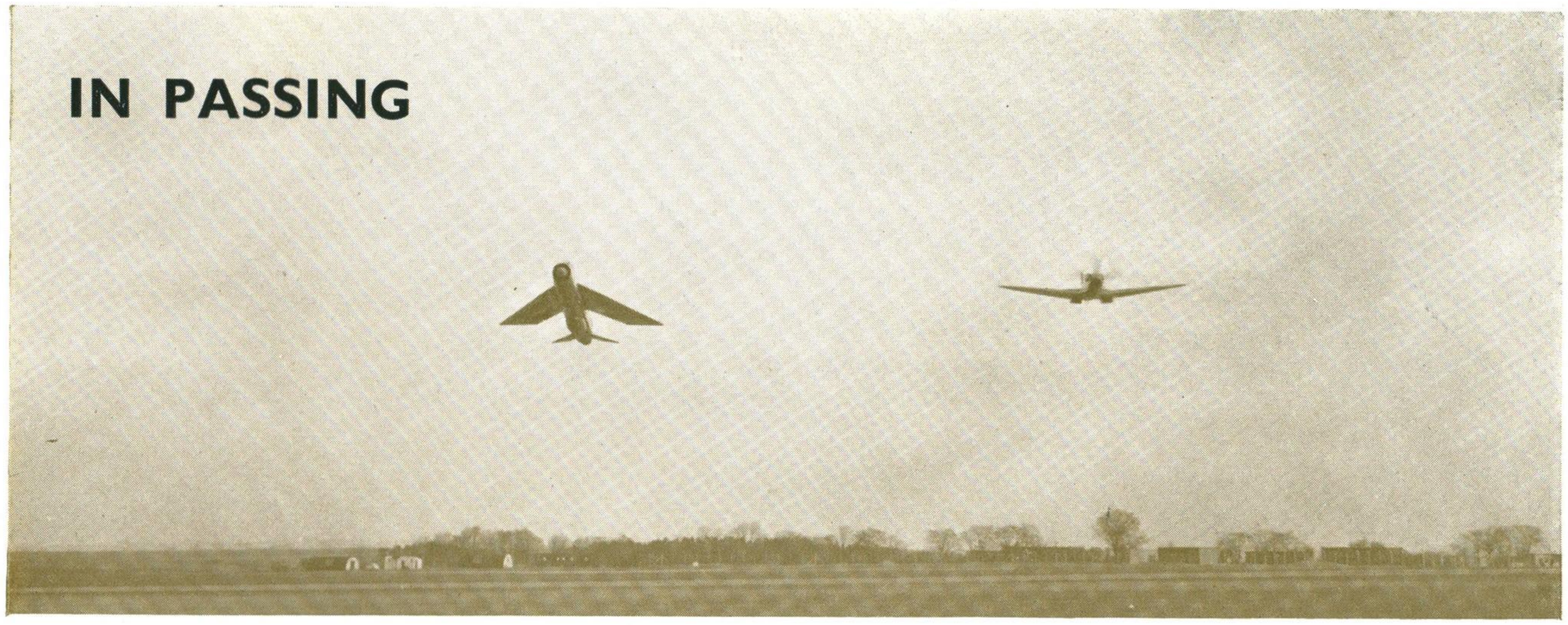
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45



IN PASSING



BATTLE OF BRITAIN WEEK 1965

The twenty-fifth anniversary of the Battle of Britain will be commemorated September 13th to 19th 1965 (both dates inclusive) which will constitute Battle of Britain week. Battle of Britain day will be September 15th; Royal Air Force "At Home" day, September 18th and Battle of Britain Sunday, September 19th.

On Saturday September 18th the following R.A.F. stations will be open to the public:

Abingdon (Berkshire)
Acklington (Northumberland)
Biggin Hill (Kent)
Colerne (Wiltshire)
Coltishall (Norfolk)
Cottesmore (Rutland)
Finningley (Yorkshire)
Leuchars (Fife)
St. Athan (Glamorgan)
St. Mawgan (Cornwall)
Ternhill (Shropshire)
Waddington (Lincolnshire)

Lesson Instructions

To obtain the maximum benefit from the training devices published in this *Journal*, the following procedure should be adopted.

1. **Read the text associated with the lesson.**
2. **Prepare a list of target numbers so as to be able to tackle the targets in any order.**
3. **Identify the target pictures by comparing them with the key views: start with the easy ones so as to gain experience: also use targets already identified to solve the more difficult ones.**
4. **When certain of the identity of a target write down its name *IMMEDIATELY* against the appropriate number on your list. THIS IS IMPORTANT.**
5. **Lessons should not be hurried or given a time limit. So far as beginners are concerned, it is more important to identify accurately than quickly.**
6. **Do not attempt conscious memorising of details, shapes, or names.**

VISION AT HIGH ALTITUDE

by Wing Commander T. C. D. Whiteside, M.B.E.

(*continued from page 115*)

It is evident that some procedure or help is necessary to enable a pilot to focus at optical infinity which, as far as the eye is concerned with a pupil size of 2 or 3 mm. diameter, may be regarded as being about 10 or 12 metres from the eye. Looking at another aircraft or even at a wing tip or at the ground or any distant object, will cause the eyes to focus at infinity, and this focus may be retained for some 20 to 30 seconds as one then directs the gaze to the area of empty sky. It must be remembered, however, that some of us are long-sighted and that, having directed our gaze onto a distant object, we are capable of throwing this out of focus so that the eyes are in fact focused from a point "beyond" optical infinity. When this happens we have obviously over-corrected and are just as badly off as if we were looking too near. It is consequently necessary to learn to use the eyes in searching in an empty visual field. If a distant object is being made use of as a sort of anchor for the focus point, we must look for our target aircraft in the same optical plane as that anchor point, whether it be another near aircraft in formation or one's own wing tip.

A second factor associated with vision in an empty field is that of the determination of distance and size, or of relative angular velocity of an object, once it has been detected. Everyone is familiar with the appearance of the moon when it is at the zenith as compared with its appearance when it is low on the horizon in the night sky. In the latter case it appears very much bigger, possibly because one sees it closely related to a background of objects of known size such as the roofs of houses and the outlines of trees. At the zenith it seems to be smaller, possibly because it has no objects of known size in close angular proximity. Likewise at high altitude, an aircraft, once it has been detected, often appears to be smaller and therefore further away than it is in fact. Since, however, its angular velocity appears to be unchanged, it may seem to be travelling at a higher relative speed than is indeed the case. In other words, distance from one aircraft to another tends to be over-estimated, especially at high altitude.



Cover Photo: The first of twenty Hawker Siddeley 125 trainers for the R.A.F. where they will be known as the Dominie T.1. They will be used for navigation training and can accommodate an instructor and three pupils in addition to two pilots.

Page 116 **SEA KING**

All targets are of **Sea Kings** except for No. 10 which is a **Super Frelon**.

Page 118 **HARE**

All targets are of **Hares** except for target No. 18 which is a **Wasp** and No. 28 which is a **Hound**.

Page 122 **BELFAST**

All targets are of **Belfasts** except No. 15 which is a **Cub**.

Page 124 **CESSNA T-37**

All targets are of **Cessna T-37s** except No. 12 which is a **Paris**.

Page 126 **TESTING TIME**

1 Pioneer
2 Messenger
3 Boeing 707
4 Skywarrior
5 One-Eleven
6 Varsity
7 Super Constellation
8 Coot
9 Pembroke
10 Crusader
11 Dornier Do27
12 Lightning T.5
13 Alouette III
14 Farmer
15 Sabreliner
16 Alizés
17 Vautour
18 Shackleton M.R.3
19 Colt
20 T-38 Talon
21 A-6 Intruder
22 Cosmopolitan (Canadair CL-66/Convair 540)
23 Sycamore
24 Lansen
25 Camel
26 Troopship (Friendship)
27 Cleat
28 Sioux (Bell 47G Trooper)
29 Fiat G91
30 Fishbed
31 Sea King
32 Super Aero 145
33 Max
34 Seminole
35 Hare
36 Convair 880

SOLUTIONS TO TESTS AND EXERCISES

Page 128 **RIGA CLASS**

All targets are of **Riga Class Frigates** except target photo No. 25 and target drawings Nos. 5, 14, 21 and 32 which are all **Petya Class Escorts**.

Page 131 **AIRCRAFT IN PROFILE**

1 Caravelle
2 Convair 880
3 Comet
4 DC-8
5 Camel
6 Comet
7 Comet
8 Comet
9 Caravelle
10 Convair 880
11 DC-8
12 Camel
13 Caravelle
14 VC10
15 DC-8
16 Caravelle
17 Convair 880
18 DC-8
19 Camel
20 Comet
21 Caravelle
22 Convair 880
23 Boeing 707
24 Camel
25 Comet
26 VC10
27 Convair 880
28 Boeing 707
29 Boeing 707
30 Caravelle
31 DC-8
32 VC10
33 Comet
34 Camel
35 Comet
36 Boeing 707
37 VC10
38 Caravelle
39 DC-8
40 VC10
41 Caravelle
42 DC-8
43 Camel
44 Caravelle
45 Convair 880
46 Convair 880
47 Boeing 707
48 Camel
49 Comet

Page 132 **TRY THIS FOR SIZE**

No.	Name	Tonnage	Length (ft.)	Sequence	Hull Form	Stem	Stern
1	Queen Elizabeth	83,673	1,031	MFFM	H	B2	S2
2	Constitution	23,754	683	KMFFK	H	B2	S1
3	Oriana	41,915	804	CCKFFCC	H	B2	S2
4	United States	52,072	990	KMFFK	H	B2	S2
5	France	66,348	1,035	KMFFKK	H	B2	S2
6	France	66,348	1,035	KMFFKK	H	B2	S2
7	United States	52,072	990	KMFFK	H	B2	S2
8	France	66,348	1,035	KMFFKK	H	B2	S2
9	France	66,348	1,035	KMFFKK	H	B2	S2
10	United States	52,072	990	KMFFK	H	B2	S2
11	Queen Frederica	21,239	582	KMFFM	H	B2	S2
12	Hampton Ferry	2,989	360	MFMK	H	B1	S2
13	France	66,348	1,035	KMFFKK	H	B2	S2
14	France	66,348	1,035	KMFFKK	H	B2	S2
15	Gripsholm	23,191	631	KMFFMK	H	B2	S2
16	Gripsholm	23,191	631	KMFFMK	H	B2	S2
17	Gripsholm	23,191	631	KMFFMK	H	B2	S2
18	France	66,348	1,035	KMFFKK	H	B2	S2
19	Constitution	23,754	683	KMFFK	H	B2	S1
20	Constitution	23,754	683	KMFFK	H	B2	S1
21	Queen Elizabeth	83,673	1,031	MFFM	H	B2	S2
22	France	66,348	1,035	KMFFKK	H	B2	S2
23	France	66,348	1,035	KMFFKK	H	B2	S2
24	Nieuw Amsterdam	36,982	759	MFFM	H	B2	S2
25	Queen Elizabeth	83,673	1,031	MFFM	H	B2	S2
26	France	66,348	1,035	KMFFKK	H	B2	S2
27	Imperial Bahama	16,777	609	KMFFM	H	B1	S1

All are **Passenger Liners** except for No. 12 which is a **Packet**.

Page 134 **U.S. M114 COMMAND & RECONNAISSANCE VEHICLE**

All targets are of the **M114** except for Nos. 8, 21 and 40 which are **M113s**.

A Royal Netherlands Navy officer is landed on the U.S.S. *Bausell*, a Gearing Class destroyer, by the new experimental Fairchild Hiller FH-1100 helicopter of the U.S. Army. It is possible that this helicopter, the first U.S.-produced turbine-powered light helicopter, may be developed in the anti-submarine role.





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