NOTES FROM OVERSEAS SOURCES ON AERODROME DESIGN.


(Abstract)

For "Security" reasons, the illustrations and much of the text have been omitted.

CAMOUFLAGE.

The noun "camouflage" is a coined word, produced by the French during the 1914-18 war. Its corresponding verb is "camoufler" (to camouflage), and a person who practises the art is termed a "camoufleur."

To camouflage anything means more than just to cover it up—to hide it.

In the proper use of the word there must be an implication of deception, of cunning combined with skill.

A motor car covered by a white tent fly may be hidden from view, but it could not fittingly be described as "camouflaged," because the presence of a covered object would be glaringly obvious.

A hare sitting in its "form," a moth pressing itself against a suitable tree trunk are both good examples of camouflage. They are both quite "visible," but their instinct leads them to effect camouflage by judicious selection of background, into which they so blend that it is often next to impossible to see them, so long as they do not move.

In war, the purpose of camouflage is to make location and identification of specific targets as difficult as possible.

Observation and attack may come from the air or from the ground.

Air observation will normally be from a considerable distance—several miles; but ground observation may be from only a few score of yards, and radically different technique is involved in the two cases.

There is, however, one broad principle or ideal that applies to both cases. One must try to present the enemy with a landscape devoid of arresting or unusual features.
Camouflage against observation from the ground is likely to be mainly the concern of the armed forces in contact with the enemy, but combatting air observation may concern everyone. It certainly concerns the Department of Civil Aviation, which has under its control and direction large and important works, the destruction of which would be serious for us, and the capture of which would be valuable to the enemy—and at present many of these works are identifiable from the air for a great many miles.

Accurately to bomb a target, it must be recognisable at a distance of several miles.

If the target cannot be identified at this distance, the bomber will miss it when he lets go. If he decides to make another run he will be detained long enough to give the local defences another chance to deal with him.

If camouflage merely gives us additional opportunities of shooting at raiders while they are looking for their targets, it will have achieved a useful purpose. If it is so good that he is forced to go in for indiscriminate bombing in the hope of finding some valuable target, then it will be very good indeed.

Our task is to reduce the distance from which our aerodromes and other works attract attention or can be identified from the air.

It is important to remember that the observer in the enemy aeroplane is dependent on his own vision when aiming his bombs, even if the target has previously been located by air photography or from maps. For this reason, it is unnecessary to attempt to camouflage large features in such a way as to defy detection by air photography—in actual fact, it is impossible to do so.

It is an unfortunate fact that many large works are situated close to prominent natural or artificial features (coastlines, rivers, railways, etc.), which may act as pointers, and it may be doubted whether, in these cases, camouflage is worth attempting; but one should bear in mind that the enemy pilot is not likely to be familiar with the countryside and that he has presumably been harassed by defence measures, and that, therefore, anything which makes his target less conspicuous may be of critical importance.

The would-be camoufluer of aerodromes is faced with difficult problems.

(1) He must try to imitate local surroundings.
(2) He must try to distort or disrupt the apparent shape and size of landing areas, runways, felled approaches, buildings, etc., so as to make them unrecognisable, inconspicuous, or "natural looking" (and few things are less "natural looking" than large aerodromes).

(3) He may have to resort to the use of dummy or faked features to direct attention away from the real objects.

Camouflage of the capital city type of aerodrome, applied after construction, can hope, at best, to reduce the detection range from, say, thirty miles to something under ten. (There is one aerodrome which, without treatment, was stated to be visible and identifiable for what it was at a distance of 50-60 miles.)

The sound and sensible method is to design the camouflage as a necessary feature of the establishment, and to build it in during construction.

Some "post-natal" treatment is possible, however, and a good deal is to be learned by studying reports from the war zones.

General Principles:

There are four main principles generally recognised, and they are usually applied in combination. They are:—

(a) Toning down.
(b) Shading and countershading.
(c) Disruptive and connective patterning.
(d) Imitation.

Landing Areas:

The huge clear area of an aerodrome is hard to conceal. Attempts should be made to obtain harmony with the surrounding landscape by dulling or toning down the light appearance of the landing area, by any means possible, such as the use of powders, paints, dyes; by providing "texture" or apparent roughness to the surface by faked cultivation or meadow patterning. Meadow patterning can be achieved by colouring the ground, by artificial stimulation or retardation of grass growth (using manures or semi-poisons), by mowing in rectangular plots in different directions of cutting, and with heavy or light cuts taken off. Faked tree shadows, hedge shadows, designed to link up surrounding features across the landing area, may be attempted, and imitation roads and paths can be run across the area, even over the tops of buildings.
All such attempts must be boldly conceived to meet distant, and not close, examination, but no camouflage should seriously impair the proper functioning of the establishment.

Models and sketches greatly assist the planning, but no planning should be started until air photographs and air inspections of the site and of a generous measure of its surroundings are available. Frequent air inspection during the progress of the camouflage is imperative in all cases.

**Runways, Taxiways, and Aprons:**

The long, straight lines presented by runways of any sort, whether gravel, bitumen or concrete, are visible for many miles.

Attempts should be made to make the edges irregular, and the continuity may be broken by suitable disruptive colouring designed to represent patches of tree shadow or the rectangles of cultivation plots.

Smooth surfaces, which give almost specular reflection, should be roughened to give "texture" and darker tone by providing shadows in the small hollows of the roughness.

So far no full-scale experimentation has been done in Australia, but it has been suggested that runways, tarmacs, etc., can be roughened by coating with granulated rubber stuck down with a bituminous adhesive. Rougheners using gravel may cause damage to aircraft tyres (and to the airscrews if the gravel gets adrift).

Concrete apparently does not accept paint that will stay on for any length of time, and roughening, to produce half tones instead of the glare of reflected sunlight, is a matter of extreme difficulty if the normal use of the paving is not to be interfered with. Experimentation is proceeding, and information should be available later.

**Timbered Approaches and Felling:**

It would appear to be wise to keep the felling of timber to the very minimum, however abhorrent this may be to the average Australian, who is used to considering a tree as something akin to a snake—to be killed at sight.

Straight line edges of felling must be avoided, and, broadly, all clearings should be given an appearance as much like any natural or other openings in the vicinity as may be possible in the circumstances.
It is suggested that the dark tones of forest patches be painted, or otherwise marked, to join across the clearing so that there may be, at a distance, at least some suggestion that no felling has been done. This, of course, is not easy of achievement.

The type of paint, stain, powder or surface treatment to be used to secure this result is in course of investigation in England and also in Sydney, but it is felt that full-scale experimentation, stimulated by reports from overseas, will afford the only safe guide to what is effective, and, perhaps more important, what is possible to do at the large scale that the job demands.

It will readily be conceded that to stain or change the tone or colour of, say, 100 acres (nearly half a million square yards) may take a great quantity of material and considerable ingenuity if satisfaction is to be achieved. It has been done, however, and there are photographs to prove it.

Buildings:

Very large buildings, such as aeroplane hangars, present great difficulty to the camoufleur, particularly as they are generally covered with nice shiny galvanised iron or with light grey fibro-cement. They should, at the very least, be toned down by painting drab green or drab brown, according to local background.

The shadows will always be troublesome, and may have to be broken (i.e., relieved of straight lines and of distinctiveness) by suitable netting or profile boards or screens designed to reduce shadows or to produce non-telltale ones.

Bold patterns in contrasting tones painted on roofs and walls may produce disruption of the outline, and if the darker areas of paint can be made to prolong existing lines of dark tone in the vicinity (such as patches of trees or scrub), there is a chance that visibility may be reduced.

Buildings should not be grouped in a formal "military" pattern if they are to escape detection, and as many trees as possible should be left growing between and around them.

As a rule, it is safe to paint upper surfaces dark (to reduce the effect of top light) and to paint walls (particularly under eaves, where normally in shadow) in lighter tones, thus approaching a general appearance of flatness and a reduction of the height effect.

It may be possible to continue local patterns or strips of dark or light tone right over the building in such a way as to suggest
that a road (or a belt of trees) passes uninterruptedly through the site.

Small buildings can be painted in contrasting tones, in bold, irregular patches, and ground shadows can be hidden by suitable use of nets, carried from roof to ground at flat slopes.

All paint must be matt (non-shiny) or even granular in texture. Glossy paints cannot be tolerated.

**Conclusion:**

Broadly, "tone" is much more important than "colour," since at the distance of locational air observation (possibly five miles or more) colour perception tends to become less acute, and all colours begin to merge into greys, with the major contrasts those of tone and identification dependent upon apparent shape.

If the shape of your object can be disrupted or disguised, and if it "tones in" well with its background or surroundings, you will have done well in your attempts at camouflage.