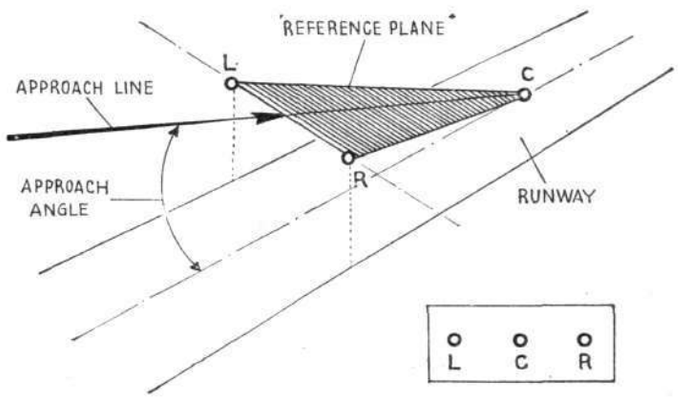
A NEW BLIND APPROACH SYSTEM

Towards "Last-moment" Accuracy

EVER since the American Bureau of Standards carried out its original blind approach experiments some five years ago, the principle behind the various systems which have been used, experimentally or otherwise, has been basically similar. All have depended upon radio beams to give the pilot the necessary glide path guide.

In a new system, known as the "three-spot," which is now being developed in America by Mr. Irving Metcalf, of the Bureau of Air Commerce, with the help of the M.I.T., the entire problem has been approached from a rather different direction. In its simplest form the Metcalf system involves the use of three lights arranged as the angles of a triangle which may be considered as the "landing reference plane." Two of these lights would be suspended on either side of the beginning of the runway at the height at which the machine would be coming in, while the third light would be on the surface of the aerodrome.

Needless to say, lights cannot be used for blind approach assistance, and this arrangement is suggested only as a means of visualising the basic idea behind the new system. If one imagines the appearance of these lights as seen by the pilot when approaching the landing runway, it is obvious that if the three are laterally in line and evenly placed the machine is on the correct line of approach. If the centre light is below the two outer ones, then the machine is below the correct line and vice versa; while if the centre light is to the right or left of its proper position, so the machine is to the right or the left of its approach line. The idea is, briefly, the theorem in plane geometry, which says that three points can determine the position of a plane, and in this case the plane is that of "landing reference" inclined to the aerodrome surface.



The Metcalf "three-spot" approach system shown diagrammatically. When the machine is on its correct approach line the pilot would see a picture such as that on the right. Movements of the three spots in relation to one another would give a perfectly clear indication of any deviation in any plane from the correct line.

Beam "Horns"

In practice the place of the three lights would be taken by electrical radiation, providing exactly the same effect and, through the medium of a suitable receiver, giving the pilot much the same kind of picture. After due consideration the infra-red idea was ignored, and it happened that at the time of Mr. Metcalf's original experiments a new method of propagating extremely short radio waves had already been developed. This method involves the use of what can only be called trumpets, which direct the beam in exactly the same manner, theoretically at least, as in the case of sound.

By employing horns of different cross-sections, different beam shapes can be obtained, and in the proposed system four beams will establish two overlapping regions, one for vertical and one for horizontal directivity. Work has already been carried out on the development of suitable types of transmitters, using a wavelength of 50 cm.—*i.e.*, a frequency of 600 megacycles. Apparently the wave patterns have turned out to be very much those which were theoretically predicted. In final form the aircraft receiver would show, on a fluorescent screen, a picture entirely similar to that of the three lights which have been used as an example, though the two outer marks would be controlled by the gyroscopic instruments. For initial approach assistance marker beacons would be used in conjunction, as usual, with sensitive altimeter readings.

The new system, which has not yet been tried out in practice, does seem to provide a possibility that the last and critical part of the approach may be more accurately gauged. At present this part is in the hands of the pilot. Hence the fact that blind approaches are still not made unless there is a reasonable degree of visibility near the ground.

Swansea-Weston Line to Keep Going

THE service connecting Swansea, Cardiff and Weston-super-Mare, inaugurated by Western Airways on July 27 last, has been so successful that, although it was originally intended to close on September 19, it will be extended right through the winter. The present daily service will be replaced, as from September 19, by a twice-weekly service, to be run on Mondays and Fridays, and providing two through connections in each direction on each of those days.

In connection with this service Straight Corporation has taken a lease of Jersey Marine, Swansea, which is centrally situated for Swansea, Neath, Briton Ferry and Port Talbot and, it is stated, serves the district better than any other airport site. Further developments planned include the establishment of an Air Guard flying training school.

To Switzerland This Winter

DURING the coming winter season Imperial Airways will be running a service in conjunction with that of Swissair for part of the period. It will be operated on week-days until October 29, and then again—daily in this case—from December 15 to March 31.

Swissair will, of course, run throughout the season, and from December 18 to March 31 the service will be run every day.

Subject to weather and such circumstances, Swissair will also run an "on request" service between Zurich and St. Moritz, where the Samaden airport will be used. Earlier this year (in the issue of February 24) *Flight* described some experiences on an experimental service to Samaden, but it was obvious then that this service could not be operated with absolute regularity since, with or without radio facilities, reasonably good weather is an essential to safety in and over the Engadine.

More Trouble in China

AFTER the attack on the China National Douglas, the Sino-German Eurasian Aviation Company suspended their service between Hong Kong and Hankow. A week later, on September 6, one of this company's machines was also attacked by Japanese fighters while flying from Hong Kong on the Yunnan service.

The attack was made near Liuchow, and according to reports the machine escaped by virtue of its superior speed. Nevertheless several bullets pierced the wing covering and a fuel tank was holed The pilot made a forced landing.

The wreckage of the Douglas was brought back to Hong Kong early last week and, despite the Japanese assertions that no attack was made, the wreckage was fairly well riddled.

Iced Take-offs

DURING the past year or two quite a few accidents and incidents have been caused by the fact that pilots have taken fully loaded transport aeroplanes off with either snow or ice on the wings. In the first case the snow may be in a semi-melted state, and may be considered to be harmless, but in fact the rapid evaporation during and after the take-off causes this snow to form solidly as an irregular mass of ice, with an obviously unpleasant effect on the aerodynamic characteristics of the machine.

A *Notice to Ground Engineers* has recently been issued by the Air Ministry in which the danger even of a deposit of hoar frost on the wing surfaces and the airscrew blades is pointed out. It is explained that unless the aerodrome is a large one and the pilot is prepared to make a longer run than usual and to expect a somewhat higher stalling speed, this deposit should be removed before the machine leaves the tarmac. An additional sentence reminds the ground staff that metal airscrews, particularly those with magnesium blades, should be dealt with carefully.