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## A BIBLIOGRAPHY OF THE MALAISE TRAP

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*Abstract.*—The flight trap designed by Malaise in 1937 was slow to attract attention but it has now become a major tool in general collecting and surveillance of insects. Its principles of operation are discussed, with mention of a few similar devices. All published notes that have come to the author's attention are listed chronologically.

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The Swedish entomologist René Malaise published in 1937 the description of a new kind of trap that had performed well in general collecting for several years. It was many years before other entomologists began to use this kind of trap, but all who did became enthusiastic about its general efficiency in capturing all kinds of flying insects at all times of the day, even night-flying insects that are not attracted to light. Modifications in the design have been made, and the trap has been adapted to the use of carbon dioxide gas as an attractant. It is now considered to be one of the major advances in collecting methods in this century.

The Malaise trap is essentially an interceptive device in which screens of non-opaque fine-meshed fabric netting serve as baffles to impede the flight of insects. The tendency of flying insects to go over or around objects in their path is then used to direct them upward into a closed chamber. The chamber is generally a killing bottle, but may contain a killing and preserving fluid. The original Malaise design and those now in use do not include an attractant, but modifications for use of a lure, notably carbon dioxide gas, have been made.

A few citations to devices that are not strictly Malaise traps have also been included. The window box trap designed by C. F. Hodge and described by Bishopp (1916) operates on much the same principle as the Malaise trap. The traps designed by Burgess (1935) consist of opaque baffles and use an attractant to lure insects into an open-sided 'lean-to.' A bright area near the top of the structure is provided with a glass jar into which the insects are attracted when they attempt to escape upwards from the semi-enclosure.

The interceptive trap described by Leech (1955) is very similar to the Malaise trap but does not include a killing chamber; the operator must collect the intercepted insects by other means. The traps based upon the eeltrap principle, called a Reuse in German, are not included here, although the killing chamber used with the Malaise trap is often constructed on this principle, that of a funnel set in the mouth of a jar. The McPhail trap (Steyskal, 1977) and many emergence traps and cone traps set over a lure also use this principle.

Malaise's design was apparently independent of any previous design. He says, "During my extensive travels I have repeatedly found that insects happened to enter my tent, and that they always accumulated at the ceiling-corners in vain attempts to escape at that place without paying any attention to the open tent-door. On one occasion one of the upper tent-corners happened to have a small hole torn in the fabric, and through this hole all the insects pressed their way and escaped. Later on the idea occurred to me, that, if insects could enter a tent and not find their way out, and always persistently tried to reach the ceiling, a trap, made as invisible as possible and put up at a place where insects are wont to patrol back and forth, might catch them better than any tent and perhaps better than a man with a net, as a trap could catch all the time, by night as well as by day . . . ." Thus, the whole idea was original.

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