CLASSIC PAPER

BATTERY-OPERATED LIGHT TRAP, AN IMPROVED MODEL[1]

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In an earlier note (Nelson & Chamberlain, 1955) a miniature New Jersey-type light trap operated on dry cell batteries was described. This model had proved useful in making live mosquito catches for virus isolation studies, and yielded valuable collections from remote areas which could not otherwise have been sampled.

Unfortunately the construction of this trap was complicated, with numerous screws and bolts making dismounting difficult. The rigid catching cage was bulky and fragile. Furthermore, slight changes subsequently made in the manufacturing specifications of the selected motor reduced its efficiency for light trap application.

The present model (Figure 1 and Figure 2) is demountable for easy transport, weighs only 1¾ lbs. and has a collapsible catching bag. The large overhang of the lid protects the operating mechanism even in heaviest rainstorms.

The major changes over the previous model are the detachable flat-topped lid, miniature ball-bearing motor and durable light bulb drawing only 0.15 amperes each, simplified motor-mounting bracket, and operation on 4 volts d.c. A 7.5 ohm resistor in series in the circuit permits

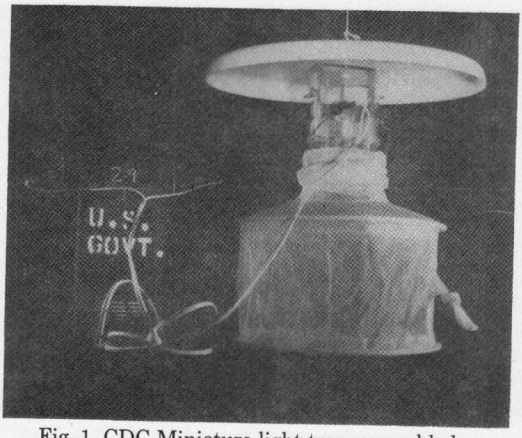

Fig. 1. CDC Miniature light trap, assembled.

Fig. 2. CDC Miniature light trap, dismantled.

[1] Reprinted from *Mosquito News*, Vol. 22, 1962, pp. 126–129. This is the fourth of a series of classic papers to be reprinted in the *Journal of the American Mosquito Control Association.* This paper was nominated by Harry D. Pratt and endorsed by the Editorial Board of the *Journal* for reprinting. Members wishing to nominate other papers for inclusion in the series should contact the Editor of the *Journal.*

The use of light traps in entomology has a very long history. N. Banks (Bulletin of the U. S. National Museum, No. 67, 1909, p. 47) illustrated an early form utilizing a kerosene lamp as the light source. The first light trap to see widespread use in mosquito control and research was the New Jersey light trap, developed by T. D. Mulhern in 1932. Mulhern's original description of the New Jersey light trap was reprinted in the *Journal* (Vol. 1, 1985, pp. 411–418) as the first in this series of classic papers.

The present paper by W. D. Sudia and R. W. Chamberlain marks an equally important advance in light trap technology. Sudia and Chamberlain's trap utilized battery power and light weight materials and components so that it weighed only 1¾ pounds and could be used in isolated and wilderness areas. In addition, it utilized a catching bag in lieu of a killing jar so that the catch could be carried live to the laboratory. These features made the trap particularly useful in surveillance and research. It came into such widespread use that Sudia and Chamberlain's paper became the most frequently cited paper ever published in the *Mosquito News* and the 16th most frequently cited paper in the 50 "core" entomology journals (E. Garfield, *Current Contents*, Vol. 27, No. 11, 1984, pp. 3–11). Thus the impact of Sudia and Chamberlain's work continues to be felt world-wide, wherever mosquito control and mosquito-borne diseases are important.—L. C. Rutledge.

[2] We wish to thank Mr. Robert Osgood and Mr. James Moore, Development Activities, CDC, for their assistance in modification and construction of the trap.

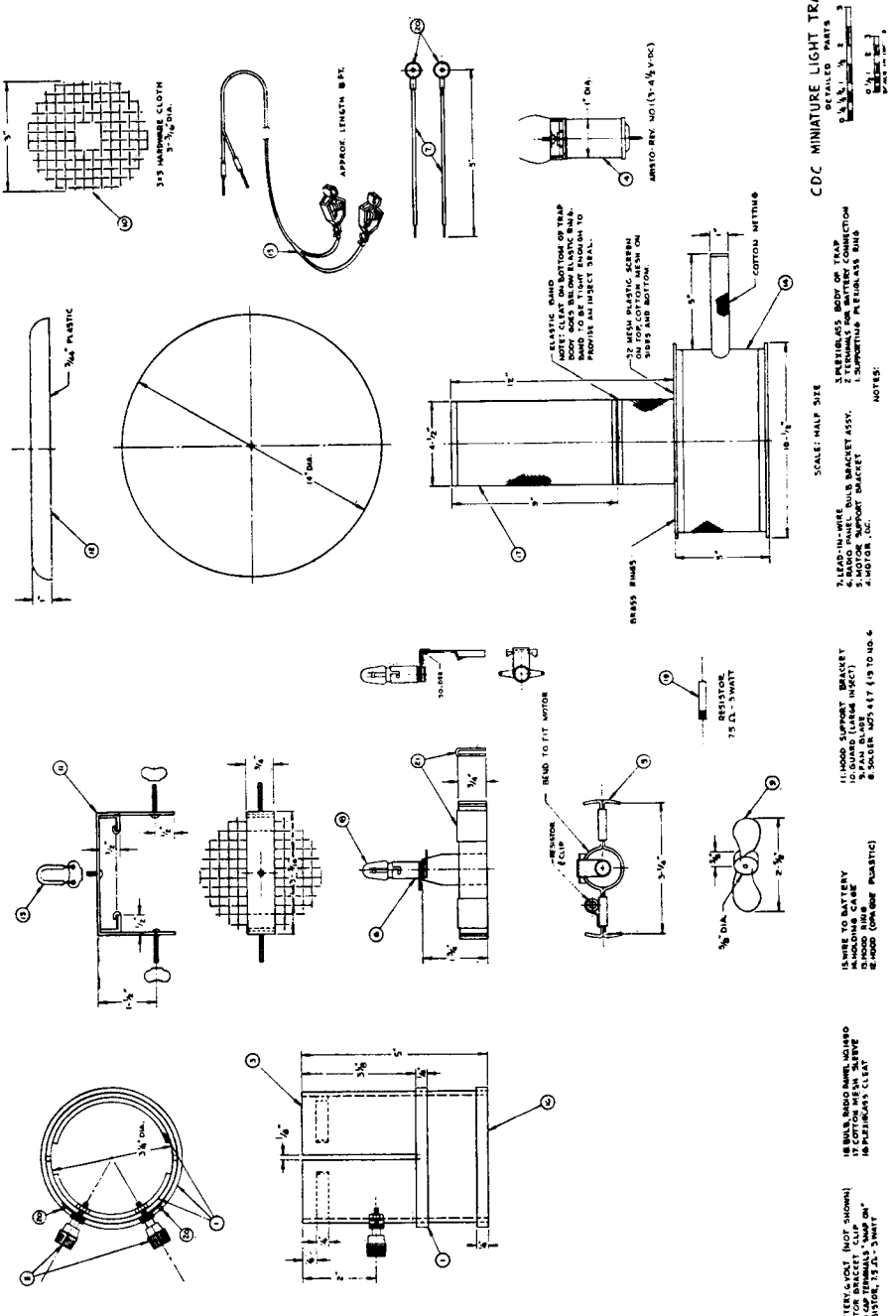

Fig. 3. CDC Miniature light trap, detailed drawing of component parts.

use of an ordinary 6-volt battery. The trap can be operated on any 6-volt d.c. source, but the use of a 30 amp-hour motorcycle battery weighing only about 10 lbs. will give up to 5 nights operation without recharging. The motor will give about 15 to 25 nights of service before wearing out. An oiling with light machine oil improves operation.

The present model has been field-tested for one year in a south Alabama virus study, and for eight months on the Big Cypress Seminole Reservation, in south Florida. Catches ranged from one-fourth to equal of those of New Jersey light traps in the same areas using 15-watt bulbs, with similar species composition. However, a considerably higher proportion of mosquitoes in proportion to "trash" insects was taken in the miniature traps. Cypress and custard-apple swamp sites in the Florida Everglades in summer generally yielded 300–1000 mosquitoes per night, comprising a number of different species. More open areas frequently yielded very large numbers of one or two species. In one instance, 25,000 *Psorophora confinnis* were collected in a single miniature trap in one night. The trap, tested by others, has also been used with success in collecting *Culicoides* and *Phlebotomus*.

The body of the trap (3) (Figure 2 and Figure 3) is a piece of 3¼″ Plexiglas tubing. A slot on each side permits insertion of the motor support bracket (5) holding the motor (4). The hood support bracket (11) also fits into these slots and is held fast by two wing nuts. The lid (12) is held in place by the hood ring wing nut (13). Color-coded binding posts (2) and "snap-on" terminals (20) permit easy connection of leads from battery and motor assembly. An elastic band in the neck of the catching bag permits attachment over the cleat (16) on the bottom lip of the trap body.

The motor support bracket is made of 22- or 23-gauge sheet metal and is formed to fit the motor and conform to the circumference of the trap body. On one side, a clip is soldered over the two halves of the motor bracket and is also bent to hold the resistor (19). On the other side, a U-shaped clip (21), unsoldered, is slipped over the bracket halves like a clothespin to hold the motor tightly in place. The bulb bracket assembly (6) is soldered into position on the side of the motor bracket so that the light bulb is centered over the motor. The fan blade (9) is made from a piece of solid Plexiglas rod as hub, which has been slotted to receive two blades of 1/32″ Plexiglas and drilled to fit the motor shaft snugly.

The brushes of the motor are held in place by slide-on brass clips. When motors are worn, they can be replaced without resoldering by sliding off these clips and placing them over the brushes of the new motor.

Color coding of wires, terminals and battery connectors will greatly aid in correctly connecting the trap to the battery, since the motor is of the reversible type and reversed connections will cause the fan to blow the wrong way.

Most of the parts can be obtained from a local radio supply house or from a plastics distributor. The Aristo-Rev No. 1 motor[3] is available from local hobby shops. A mimeographed list of parts and suppliers is available from the authors upon request. The total cost of materials used in making a trap, exclusive of batteries and labor, is approximately $10.00.

REFERENCES CITED

Nelson, D. B. and Chamberlain, R. W. 1955. A light trap and mechanical aspirator operating on dry cell batteries. Mosquito News 15:28–32.

[3] Note: Trade names are used as a means of identifying the product and their use does not constitute endorsement by the Public Health Service.