TABLE 4.—Transmission of Tensaw virus by *Anopheles quadrimaculatus* and *A. albimanus* mosquitoes.

Median initial titer*	Day	Trans./ attempts	Tensaw virus titers: Median pos.**	Transmitting mosquitoes
Anopheles quadrimaculatus				
4.8	14	3/15	4.0	4.1, 3.7, 3.3
4.3	14	1/8	3.6	4.7
4.1	14	3/15	4.0	4.8, 4.8, 4.1
3.8	14	1/16	4.2	4.2
2.7	14	4/15	4.0	5.0, 4.3, 4.0, 3.7
Anopheles albimanus				
4.1	13	1/15	3.3	4.3
3.9	10	0/20	4.1	
3.9	12	4/13	4.5	5.3, 5.0, 4.8, 4.7

* All titers expressed as the mouse $1/\text{Log}_{10}$ IC LD_{50}.

** Median positive Tensaw virus titer for all mosquitoes allowed to feed.

quadrimaculatus than in the other two mosquitoes and there appeared to be little or no relationship between the amount of virus ingested by this species and the resultant virus titers. Very low quantities of virus were sufficient to produce infection in the *A. quadrimaculatus* and *A. albimanus* mosquitoes, and infection thresholds were similar for these two species.

Transmission of Tensaw virus was obtained by the feeding of *A. quadrimaculatus* and *A. albimanus* on suckling mice after 12 to 14 days of extrinsic incubation. The amount of virus initially ingested did not appear to affect the transmission rate.

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AN IMPROVED PORTABLE RESTING STATION FOR *ANOPHELES QUADRIMACULATUS* SAY

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Malaria control has always been an integral part of the TVA resource development program. The extensive mosquito control measures against the vector, *Anopheles quadrimaculatus,* require intimate knowledge of the extent of anophelism in the various reservoirs involving approximately 10,000 miles of shoreline in parts of seven states. For this purpose, an annual mosquito inspection service is conducted whereby inspectors report weekly counts of adult mosquitoes from more than 250 diurnal resting shelters throughout the Valley. In connection with this program, TVA, since 1935, has been interested in devices that would give dependable measurements of anophelism in the vicinity of its reservoir shorelines. Such devices must be portable, economical, and effective.

The idea that *Anopheles* mosquitoes entered diurnal resting places primarily

for shelter was first introduced by Smith (1939) who developed the use of the common nail keg as a means of determining relative density of *Anopheles* in the Tennessee Valley. Goodwin (1942), working in southern Georgia, investigated the general principle of the small portable resting station and developed the "red box" type of station which has been widely used since that time, particularly for measuring *A. quadrimaculatus* densities. Some advantages of artificial resting places over natural resting places for measuring anophelism in an area were pointed out by both Smith (1942) and Goodwin (1942).

In recent years it has been increasingly difficult to find reliable natural resting shelters, and the once common wooden nail kegs are no longer available. Consequently, the red box type station has been used with increasing frequency. This type of shelter is also used in special insect surveys involving mosquitoes and is often used to help pinpoint breeding situations. During the summer of 1966, a less expensive and more portable shelter was devised which gave better results than the red box shelters when competitively compared in the field.

MATERIALS AND METHODS. The device described herein consists of a red cloth sack supported at the open end by a square wooden frame and at the closed end by cord or wire strands anchored to nearby trees, limbs, or bushes (Fig. 1). The frame portion is made by nailing four pieces of unpainted softwood framing 12" x 1" x 1" to form a square. The cloth portion is made from a 52-inch-long piece of 36-inch-wide broadcloth folded down the middle to a doubled 18-inch width. Fold-to-edge seams are stitched at each end and at 25 inches from each end. Cutting between these two seams makes two sacks. The sack is then stapled to the wooden frame through doubled edges which completes construction. The internal surface area is essentially equal to that of a 1-cubic-foot red box. All experiments were conducted in Blackwell Swamp, Wheeler Reservoir, north of Decatur, Alabama.

RESULTS. Figure 2 shows results ob-

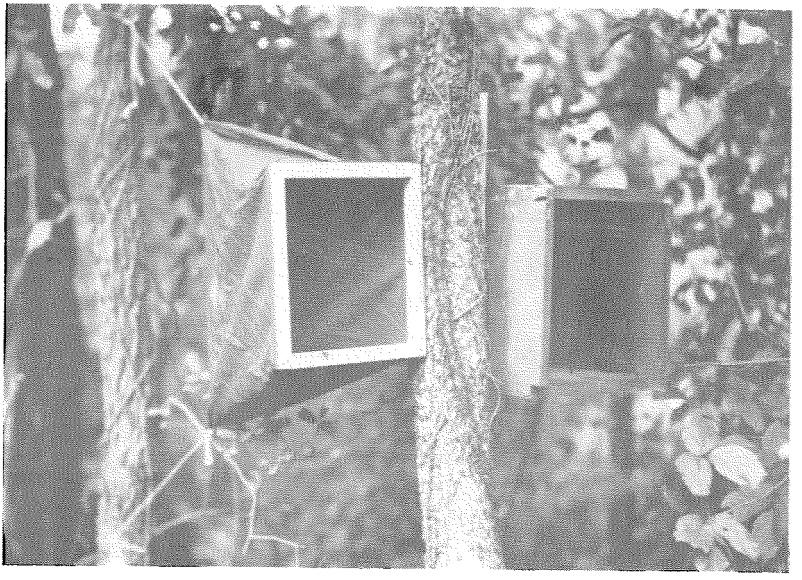

FIG. 1.—Sack type red cloth and red box in operating position.

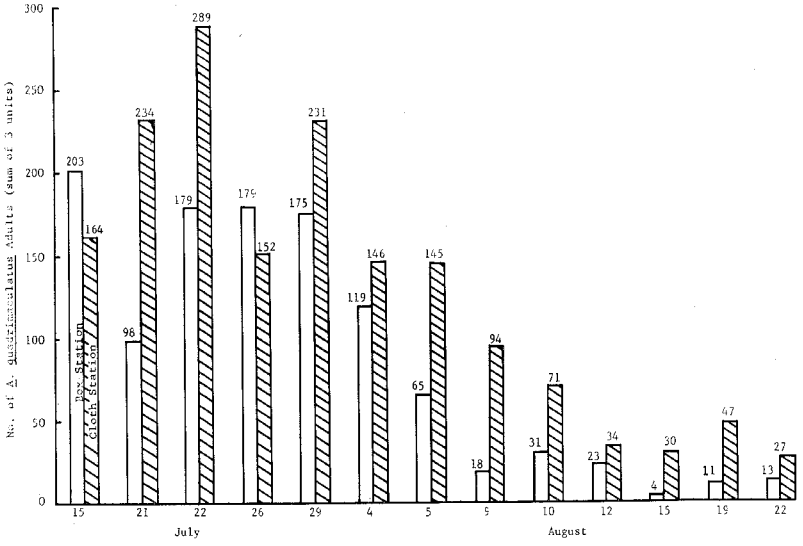

FIG. 2.—Adult *Anopheles quadrimaculatus* counts in competitive, 3-unit, red box and red cloth stations, Blackwell Swamp, Wheeler Reservoir, 1966.

tained in 13 counts between July 15 and August 22, 1966, when three cloth units were competitively compared with three red box units. Three different locations were used with a box and cloth station at each location. The locations were separated by about 50 feet and, in each, the box was nailed to one side of a tree at about 30 inches aboveground and the cloth unit was attached to the other side of the tree at the same height (Fig. 1). The lumped counts from the three locations show that the cloths were superior in mosquito counts on 11 of 13 occasions.

Favorable results obtained in the foregoing experiment necessitated expanded experimentation which was commenced on August 9, 1966. In this case, three stations, each with three locations (substations), were established in a separate area. Again, counterpart cloths and boxes were positioned on the opposite side of trees at the same height (30 inches) aboveground. Results are given in Table 1. Totally, six counts were made at irregular intervals between August 9 and August 22, and 789 *A. quadrimaculatus* adults were counted in the nine cloth stations as compared to 369 in the nine red boxes. Each 3-unit station showed higher total counts in the cloths than in the boxes, and at only one of the nine locations (Station II-A) was the count higher in the boxes than in the cloths. Occasionally, individual boxes "outdrew" the counterpart cloths on a given day; however, an analysis of variance showed the cloths to be significantly better at the 5 percent level.

DISCUSSION. The "sack type" portable resting stations reported herein may not replace red boxes, for their durability has not yet been tested thoroughly. However, by using a number of these devices as "feelers" in an area, best locations may be determined and then used as the permanent routine collecting station. They have the decided advantages of being much lighter, more portable, and less expensive and they are quickly and easily made. The cloth construction permits air circulation around the mosquitoes which show less excitability in the sacks than in boxes. Rain seems to have no effect on the effi-

TABLE 1.—Adult *Anopheles quadrimaculatus* counts in competing red box and red cloth stations, Blackwell Swamp, Wheeler Reservoir, 1966.

Sta. no.	Sub-station	August 9		August 10		August 12		August 15		August 19		August 22		Total all dates	
		Box	Cloth	Box	Cloth	Box	Cloth	Box	Cloth	Box	Cloth	Box	Cloth	Box	Cloth
I	A	18	94	15	13	12	12	2	2	6	16	6	8	59	145
	B	4	56	10	36	9	14	0	21	4	23	6	9	33	159
	C	6	24	6	22	2	8	2	7	1	8	1	8	18	77
Total		28	174	31	71	23	34	4	30	11	47	13	25	110	381
II	A	24	23	16	22	30	2	15	9	2	3	2	8	89	67
	B	7	19	13	10	6	3	4	3	4	4	1	5	35	44
	C	15	30	14	11	6	8	3	9	1	7	2	15	41	80
Total		46	72	43	43	42	13	22	21	7	14	5	28	165	191
III	A	17	19	9	31	9	17	8	11	3	10	4	6	50	94
	B	5	14	3	16	3	4	2	2	1	3	1	1	15	40
	C	7	27	5	23	6	4	4	7	3	15	4	7	29	83
Total		29	60	17	70	18	25	14	20	7	28	9	14	94	217
Total all stations		103	306	91	184	83	72	40	71	25	89	27	67	369*	789*

* Significantly different at the 5% level.

ciency of the cloth units and indications are that durability is good.

SUMMARY. An improved artificial resting device for *Anopheles* mosquitoes made of cloth and a wooden frame more portable and less expensive than the red box type is described. In field tests conducted in north Alabama, they gave consistently higher counts of *A. quadrimaculatus* than counterpart red boxes when competitively compared.

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COLONIZATION OF *WYEOMYIA SMITHII* (COQUILLETT) FROM CONNECTICUT

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Wyeomyia smithii is a mosquito commonly found breeding in water collections at bases of the leaves of pitcher plants. However, little has been reported concerning the habits of this mosquito since early accounts of its biology by Smith (1904) until Price (1958) successfully colonized it in the laboratory from material collected in Minnesota. Price (1958) reported the unusually high incidence of a unique type of teratological phenomenon in monster embryos. He suggested that colonization and study of this species in other regions would be necessary to determine the significance of this phenomenon. Consequently, the purpose of this communication is to report the successful colonization of this species from material collected in Connecticut, and details of the bionomics.

Though the distribution of most of the species of the genus *Wyeomyia* is confined to the tropical and subtropical regions of the New World, *W. smithii* is found in a wide region of southeastern Canada and the northeastern United States. The larvae occur in water at the bases of leaves of *Sarracenia purpurea* and may be found during any season of the year, and during the winter months they low as −14° C. (Owen, 1937). Haufe (1952) observed larvae in water in pitcher plant leaves as far north as Goose Bay, Labrador, throughout the summer, where larval activity was noted in large plants exposed to the sun during the day, even when temperatures were near freezing and ground pools were covered with ice.

Smith (1904) gives a detailed account of the biology of this species. He observed that adult females rest in the pitcher plant leaves in a peculiar head-down position, with the hind legs curled back up over the abdomen. He further observed that the female deposited eggs in the young leaves which had not yet collected water, as well as on the sides of older leaves above the water line. The eggs were deposited singly, and larvae hatched from them after the water level rose in the pitcher plant.

The female is not known to feed on man, and no observations have been reported concerning a source of blood for this species.

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