Energy expenditures of caged postmigrants in Panama.—Information concerning the energy requirements of small insectivorous birds is scanty. Perhaps one of the best approaches to studying the energy expended by these organisms is to determine weight losses, and to assign caloric values to these losses. An exact caloric value to be applied to weight losses is still an unanswered question. However, there are two lines of evidence that weight losses under some circumstances may be considered to consist of fat only. The first evidence is that trans-Gulf migrants in the spring show no loss of fat-free weight when compared to premigrants (Odum *et al.*, *Science*, 143: 1037-1039, 1964). Probably the best direct evidence comes from the comparison of fat loss with metabolic determinations based on isotopic turnover of D_2O_1 (LeFebvre, *Auk*, 81: 403-416, 1964).

During the fall of 1963, several fat postmigrants were caged for 24 hours in western Panama and their weight losses were calculated. The data are given in Table 1. The conversions of weight losses to energy expenditures were based on the assumptions that the losses consisted of pure fat and that the caloric value of the fat was 9.0 Kcal/g (Odum *et al.*, *Ecology*, 46: 901-904, 1965). Since the cage was rather large, 3 m. x 4.5 m x 3 m high, these data may very nearly approach

TABLE 1. ENERGY EXPENDITURES OF CAGED MIGRANTS BASED ON TWENTY-FOUR WEIGHT CHANGES. REPUBLIC OF PANAMA.

Species	First wgt	Second wgt	Caloric* Value of weight loss Kcal	Kcal/g** of bird per hour
Red-eyed Vireo *Vireo olivaceus*	16.37	14.51	16.74	.05
	18.28	16.34	17.46	.04
	17.30	15.42	16.92	.04
	16.31	13.92	21.51	.06
	21.64	18.72	26.28	.05
	17.47	14.78	24.21	.06
	16.67	14.53	19.26	.05
	16.19	14.01	19.62	.05
	17.41	15.42	17.91	.05
	15.76	14.23	13.77	.04
	16.06	13.96	18.90	.05
	15.72	13.17	22.95	.05
	15.06	12.80	20.34	.06
	15.97	14.45	13.68	.04
	17.15	15.56	14.31	.04
Canada Warbler *Wilsonia canadensis*	9.57	8.31	11.34	.05
	9.12	7.99	10.17	.05
	9.49	7.80	15.21	.07
	9.83	8.61	10.98	.05
Black and White Warbler *Mniotilta varia*	11.19	9.51	15.21	.06
	10.75	9.47	11.52	.05
Mourning Warbler *Oporornis philadelphia*	13.53	11.38	19.35	.07
Kentucky Warbler *Oporornis formosus*	11.81	10.51	11.70	.04

*Kcal based on 9.0 Kcal/g of weight lost.

**Mean of first and second weights used as the weight to arrive at energy expended per gram of bird.

what one might find in the field. Temperature data for this location are not available, but the mean daily temperature of about 27° C. with a daily range of 21° C - 32° C, which is found at the same latitude in Panama City, is probably correct. Indeed these temperature conditions are monotonously similar throughout coastal areas of the lower half of Central America.—David T. Rogers, Jr., Dept. of Biology, Univ. of Alabama, P. O. Box 1927, University, Ala. 35486.