in fact, no large-scale collections have been made farther north than southern Vermont and New Hampshire (Spiess, 1949, Jour. N. Y. Ent. Soc.). A recent collection sent from the Mt. Desert Biological Survey, Bar Harbor, Maine, during the summer of 1950 included the following species: affinis (1), algonquin (4), athabasca (5), melanogaster-simulans (173), melanica paramelanica (5) putrida (3), quinaria (2), quinaria group (?) (1), robusta (2), and busckii (4). Except for athabasca and algonquin, all other species here are first evidence of their northern distribution. Bar Harbor is in the Transition Life Zone, but since this collection was made in mid-summer it is not too surprising to find forms like paramelanica and busckii in the population.

In October of the same year we made a collection in Lexington, Massachusetts, with the following results: algonquin (8), athabasca (25), melanogaster-simulans (1 female), immigrans (5), busckii (3), putrida (1), sigmoides (1), transversa (1), Chymomyza amoena (1). The presence of sigmoides in this collection is unusual, since its center of distribution is approximately Tennessee-Carolina and it has never been taken north of New York City. The collecting site was in birch and oak woods about a quarter of a mile from a settled area. All the other species have been taken at that time of year in the Boston area.

Spiess, E. B., Ketchel, M. and Terrile, B. A. Physiological properties of gene-arrangement carriers in D. persimilis. Flies from Jacksonville, California, (elev. 800) containing the Whitney and Klamath arrangements of the third chromosome have been tested for egg-laying capacity, longevity, wing-beat frequency, and wing-area dimensions. Various culture conditions and mating procedures were utilized in the latter two cases; but the basic experimental procedure throughout was the mixing of strains at random in a population cage in order to get genetic heterozygosity with gene-arrangement homozygosity. All cultures were kept at 15° C. Heterozygotes for gene arrangements were F_1's of population-cage progeny. Results were as follows: (1) Egg-laying capacity: WT/WT maintains about 13-15 eggs per day for about 100 days; KL/KL starts at 13.5 for ten days, but falls off to 8-9 eggs per day for the next 100 days; WT/KL maintains a high rate of production (17-20) for the first sixty days, thereafter falling off faster than homozygotes. In senescence (100-170 days from pupa) all three types give equal rates, a fact which might be expected since natural selection would have built up genetic combinations for high production in early life. (2) Both homozygotes survive equally well under these experimental conditions, but heterozygotes have a significantly lower mortality rate. All three have long-lived individuals which survive until about 170 days. (3) Wing-beat frequency (using a stroboscopic method perfected by Williams and Chadwick): WT/WT. 11,020 beats per minute; KL/ KL, 9170 beats per minute, WT/KL (from WT mothers), 11,410; WT/KL (from KL mothers), 11,090. All standard errors are less that 100 beats per minute. (4) Wing-area dimensions for these types are WT/WT, 2.60 mm^2; KL/KL, 3.16 mm^2; WT/KL (WT mothers), 3.07 mm^2; and WT/KL (KL mothers), 2.76 mm^2. Standard errors are less than 0.04 mm^2. A "stroke-energy" index proportional to the kinetic energy given to the air by the wing beat (Reed, Williams, and Chadwick, Genetics, 1942) can be applied to determine which type is expending the greatest amount of energy. This index is as follows for these zygotic types: WT/WT, 762; KL/KL, 830; WT/KL (WT mother), 1236; WT/KL (KL mother), 907. By varying the culture conditions and mating procedures in different ways, wing dimensions and wing-beat frequencies may be caused to vary rather considerably; but in all cases so far heterozygotes have had a higher "stroke-energy" than either homozygous type, although in some cases not significantly higher. These are being retested at present.

The heterosis exhibited here is not the result of crossing after inbreeding. Strains of flies are maintained by mass matings, so that genetic heterogeneity is encouraged. The limits of heterosis due to crossing strains should already be accounted for by using the population cage, so that heterosis exhibited is clearly due to heterozygosity of the third chromosome. These tests can be used to analyze the variation involved in a gradient in relative frequencies of gene arrangements up an altitudinal transect in the Sierra Nevada.

Spurway, H. D. subobscura is very well adapted for prolonged experiments. A single pair transferred to a fresh bottle daily will often give 600 to 800 imagines, and will continue breeding for over a month. Research on the possible effect of parental age is under way, and it is hoped to construct a fertility table.

Tattersfield, F., Kerr, R. W., Taylor, J. and Kerridge, J. R. Resistance to the toxic effects of DDT. Work has been actively prosecuted to ascertain whether resistant strains of D. melanogaster (Rothamsted var.) could be obtained by repeated sprayings with DDT suspensions. A resistance of 1.5 to 3 times that of the original parent strain has emerged. The physiological and morphological characters are being studied. The effects, on resistance to DDT and CO_2, of age of individual and of parents, and of certain environmental factors, are being examined. The maximum resistance to DDT has been found, by R. W. Kerr, to occur at an age of the adult fly of about five days, and this is correlated with a higher respiration rate (Rothamsted wild-type). A "hybrid" stock supplied by B. J. Harrison, Bayfordbury, Hertford, England, is now under experiment.

Ulrich, Hans Killing of Drosophila eggs by partial X-raying. Single sectors 0.1 mm in length, representing one-fifth of the Drosophila egg (average total length, 0.52 mm), were separately X-rayed at different ages of the eggs with a dose of 1000 r (217 r/min, 50 kv, 2 ma). The resulting percentages of non-hatching (i.e., killed) eggs were used as index of radiosensitivity of the several sectors. Eggs irradiated when 15 to 39 minutes old show a definite, high maximum (66.5% corrected) in the second fifth counting from the anterior pole, the middle fifth giving lower (24.2%) and the three other fifths very low percentages (3.5% to 5.4%). This characteristic distribution of radiosensitivity agrees well with the developmental state according to Rabinowitz et al.). The egg when 15-30 minutes old contains either the two pronuclei or 2 to 4 cleavage nuclei , lying mainly in the second fifth. The high susceptibility of this sector may be due to the presence of these nuclei; the mean susceptibility of the middle fifth may be due to extending of nuclei to this section, but also to the method used in localizing the irradiation in this fifth. The fifths 1, 4, and 5, containing no nuclei, are not sensitive. This result contributes to the problem of whether nucleus or cytoplasm is responsible for the death of cells after irradiation. In older eggs (1-2, 2-3, up to 5-6 hours) radiosensitivity is distributed throughout the egg, but not equally, the maxumum remaining in the second fifth. But in general the maximum is not so pronounced as in youngest eggs. The middle fifth gives only a little lower, the other fifths definitely lower percentages than the second fifth. The killing rates after partial X-raying of eggs older than 2-3 hours are low throughout. This agrees with the result of total X-raying, demonstrating a rapid decrease of radiosensitivity in older stages of embryological development.