Letters

National Cancer Institute Monographs

The National Cancer Institute publishes monographs presenting series of papers on specific subjects of importance to cancer research and proceedings of conferences and symposia dealing with cancer and closely related research fields.

Four monographs have appeared to date: No. 1, "Estrogen-Induced Tumors of the Kidney in the Syrian Hamster" (December 1959); No. 2, "Symposium on Normal and Abnormal Differentiation and Development" (March 1960); No. 3, "Conference on Experimental Clinical Cancer Chemotherapy" (August 1960); and No. 4, "Symposia—Tumor Viruses" (September 1960).

Investigators, institutions, or sponsors of meetings should write to me for information concerning submission of material. Manuscripts offered for publication as a National Cancer Institute monograph should conform to the instructions to authors appearing on the inside back cover of the *Journal of the National Cancer Institute.*

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Progeny Yields in Drosophila

In a recent report by W. C. Levengood and M. P. Shinkle [*Science* **132**, 34 (1960)] regarding environmental factors influencing progeny yields in *Drosophila* it is stated that "atmospheric pressure effects on progeny yields . . . appear not to have been previously reported." Although comparatively little work has been done, there have been some publications applicable to the subject. For example, Stephen and Bird [*Can. Entomologist* **81**, 132 (1949)] studied some effects of different pressure levels on oviposition in the cabbage worm, *Pieris rapae.* Moreover, in reviews by Uvarov [*Trans. Entomol. Soc. London* **79**, 1 (1931)] and Wellington [*Can. J. Research* **24**, 51 (1946)] reference is made to Pictet's studies on pressure effects on emergence of *Pieris* adults. Although Levengood and Shinkle seem to have been concerned principally with numbers of progeny in their experiments, the observations by Pictet and by Stephen and Bird are directly applicable to experiments concerning progeny yields. Stephen and Bird found increased oviposition in insects exposed to relatively low pressures (900 to 930 mbar) as compared with that at higher pressures. Pictet reported that pressure changes might contribute to the success or failure of *Pieris* to emerge from the pupa. Parental oviposition and subsequent emergence from the pupal stage each may influence the final number of adult progeny. Incidentally, the results of Stephen and Bird (increased oviposition at lower pressures) do not support the data of Levengood and Shinkle (decreased number of progeny from matings during lower pressure).

Levengood and Shinkle also report results of rearings of *Drosophila* in an electrical "field." They found a lack of correlation between numbers of progeny and pressure level during mating, under the influence of the field. However, they do not give the amount of variability in the progeny data—a statistic which would aid in interpretation of these data, particularly since so much stress is placed upon this negative effect. The field presumably was developed through and around the culture medium. It would also have been helpful, therefore, if some indication of the dielectric capacity of the culture medium were given, since the dielectric capacity is inversely related to the field strength within the medium.

The authors appear not to have been too sure of the difference between an electrical *field* and an *amount* of electricity. For example, they state that the "electrostatic field strength was estimated to be 7×10^2 coul." But a coulomb expresses quantity of electricity, quite distinct from field strength per se. The latter should be expressed in terms of force (newtons) or electric intensity (newtons per coulomb) [J. A. Chalmers, *Atmospheric Electricity* (Pergamon, New York, 1957)]. As Chalmers stated, many authors refer to the electrical field of the atmosphere in terms of the potential gradient (volts per meter); the difference between the latter unit and electric intensity (E) is merely one of sign.

I am not clear on the meaning of the last two paragraphs of the report of Levengood and Shinkle. For example, in the sentence, "The electric field appears to provide a certain amount of protection and reduces the variations found outside the field"—variations in what? And in the sentence "Flies in the electric field are, in a sense, protected or shielded from external fluctuations," what external force is fluctuating? Are the authors referring in these two sentences to the natural, atmospheric electrical field? If they are, it seems to me that the field (potential gradient) within the laboratory building would not be important any-

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appendixes. The decay-rate calculator is a circular-disk type that provides information on remaining activity when half-life and original activity are inserted. The handbook and the calculator are both available free of charge in small quantities. (Atomic Energy of Canada Ltd., Dept. Sci12, Commercial Products Div., P.O. Box 93, Ottawa, Can.)

■ DYNAMIC BALANCER for gyros consists of a balancing stand and an amplifier. Rotors up to 2½ in. in diameter and weighing up to 16 oz are accommodated. Balancing speeds from 8000 to 10,000 rev/min are available. Unbalance vibration as small as 0.25×10^{-6} in. is said to be determined. The tester discriminates between bearing noise and unbalance vibration. Provision is made for analysis of the former. (Micro Balancing, Inc., Dept. Sci3, Herricks Rd., Garden City Park, N.Y.)

■ PULSE GENERATOR furnishes pulses of 0.5 nsec duration at repetition rates of 50 to 60 per second. Spectral intensity is said to be flat within ±0.5 db from 60 kcy/sec to 1000 Mcy/sec. Output into a 50-ohm resistive load is a maximum of 101 db above 1 μv/Mh₈ and is adjustable in ¼-db steps from 10 db to maximum. Power requirement is 30 watts at 105 to 125 volts, 50 to 60 cy/sec. (Stoddart Aircraft Radio Co., Dept. Sci11, 6644 Santa Monica Blvd., Hollywood 3, Calif.)

■ FREQUENCY CONVERTER delivers 100 va with a wide selection of frequency ranges from 50 to 4000 cy/sec and fixed-frequency accuracy said to be ±0.001 percent. Nominal harmonic distortion is 1 percent. The unit has zero output impedance and zero recovery time and is capable of handling resistive or reactive loads. (Tel-Instrument Electronics Corp., Dept. Sci5, 728 Garden St., Carlstadt, N.J.)

■ FREQUENCY MEASUREMENT to 220 Mcy/sec is provided by model 1290 extender for use with the manufacturer's model 1039 solid-state counter timer. The combination can be utilized for measurement of frequency, period, time, ratio, and phase. (Systron-Donner Corp., Dept. Sci6, 950 Galindo St., Concord, Calif.)

■ CURRENT MEASURING INSTRUMENT has full-scale ranges variable from 1 ma to 3 na in 12 settings. Drift is said to be less than 0.01 percent/hr, and accuracy ±1 percent of full scale. Response time is 10 msec. An auxiliary output provides for driving a 1-ma recorder. (Elcor Inc., Dept. Sci8, Falls Church, Va.)

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way, due to the Faraday effect of the building. If the authors found that there was a field within the building, there would still be a Faraday effect applicable to the culture medium within the bottles.

In experiments to study progeny yields one should also consider the factors which affect behavior and oviposition of the parents, in addition to those factors which might act on larval development. In this regard, one of the "unknown factors" Levengood and Shinkle associated with barometric pressure changes might be air ions. Air-ion densities are known to change with different kinds of weather, and I have found that positive air ions can influence the activity of adult blowflies.

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We would first like to comment on Edward's question concerning variability in progeny yields from cultures subjected to the influence of the electric field. The 16 cultures in the electric field disclosed a mean deviation of 32.3 percent, whereas the control-group data showed a mean deviation of 52.4 percent. Also, the average progeny yield of flies grown in the electric field was 35.4 percent higher than the average for the control groups. When we made the statement that the electric field appears to provide a certain amount of protection we were, of course, referring to this decrease in variation and increase in progeny yield from cultures within the electric field. These figures were not included initially, due to the inevitable discrepancy between the allotted space and the amount of information one wants to provide.

We feel that the outer envelope of glass (the culture bottle) is the most important factor in reducing the field strength. The dielectric constant of glass varies between 5 and 10, and in our calculations we used a value of 8 to be on the high side. The magnitude of the electrostatic field approximated from the physical dimensions is 7×10^{-9} coul; the exponent was inadvertently changed from −9 to 2 when the manuscript was initially compiled. If Edwards prefers that the field be expressed in terms of electrostatic field intensity, then it is again necessary to make approximations because of shape factors. The general field intensity in which the bottles were placed was about 2.5×10^5 v/m. The directional field may be of sufficient strength to produce ionic drift toward the electrodes and decrease the density of air ions within the bottles. The effects of ions with known specific charges on physiological processes have been previously reported by Krueger *et al.* [*Proc. Soc. Exptl. Biol. Med.* **102**, 355 (1959)].

Ionizing radiation produced by cosmic rays is known to affect the electric and geomagnetic fields surrounding the earth. These fluctuating electric-field effects at high altitudes are believed to influence the production of less energetic ions at the earth's surface. The ionization at lower altitudes is also affected by barometric pressure, and the increase in ionization with decreasing pressure is an absorption effect. It is conceivable that this increase in ionization with decreasing barometric pressure could account for the pronounced decrease in the progeny yields from control cultures. It is these air-ion effects which we feel are significant in causing the variations, and not a Faraday effect as suggested by Edwards.

In reviewing the literature, no reference could be found pertaining to the effects on *Drosophila melanogaster* of varying barometric pressure. Pictet (1904–21) makes no reference to *D. melanogaster* but mentions only emergence of adult insects from pupal tissues. He mentions that the majority of adults emerge on the fall of the barometer; this could be explained possibly by brittle pupal cases, the result of greater evaporation of liquids at the lower pressure. This has nothing to do with matings in *Drosophila.* Also, Parman has stated that adult insects seem to emerge during periods of high pressure [D. C. Parman, *J. Econ. Entomol.* **13**, 339 (1920)]; thus, the effect of pressure on emergence appears to be in question.

As Edwards stated, Stephen and Bird observed an increase in oviposition in *Pieris rapae* at low pressures; however, an aspirator was used to produce the variations in pressure. This creation of artificial pressure variations would not correlate with changes such as air-ion variations occurring with natural fluctuations in atmospheric pressure. Also, these experimenters consider only one stage in the life cycle of the insect, whereas our experiments are based on complete life cycles of a number of generations of *D. melanogaster.*

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