

Keltner, L. University of Oregon, Eugene, Oregon. Low temperature enhancement of fluorescence as an aid in chromosome banding.

A technique developed by the author for investigation of inorganic crystalline solids is being used to enhance resolution of fluorochrome stained chromosome preparations.

As the relative temperature drops, the probability of non-radiative decay of excited atoms to the ground state decreases, resulting in proportionally greater photon emission. Excitation of fluorogenic substances with radiation in the ultraviolet range thus elicits enhanced fluorescence when the temperature is lowered. Photometric studies of two variations of the acridine molecule, quinacrine mustard dihydrochloride and acridine orange, demonstrate significant increases in fluorescent behavior over the lowering temperature range of 0 to -190°C , with the dyes both in aqueous solutions and in solutions containing calf thymus DNA.

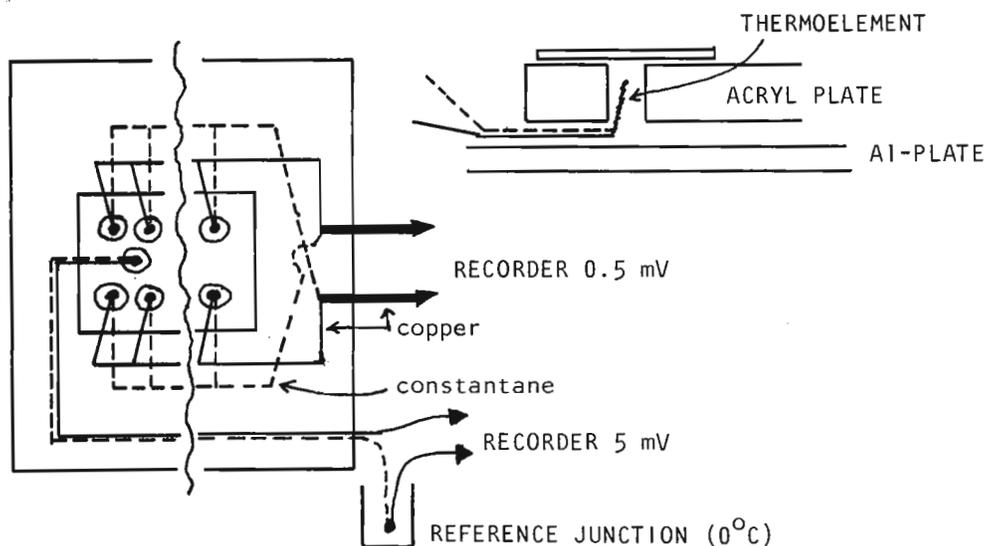
Preliminary results show enhanced resolution of fluorescent banding in chromosomes treated with quite low concentrations of quinacrine mustard dihydrochloride and examined at temperatures in the -100 to -190° region. The stability of the fluorochrome may also be accentuated. Dr. David Wagner of the University of Oregon has also found striking increases in fluorescence at low temperatures of chromatographic preparations of lichen extracts, assisting in identification of difficult materials.

Further studies are underway to determine precise fluorochrome concentrations and optimum temperatures for maximum resolution, and to overcome difficulties encountered with apparatus at the required temperatures.

Lumme, J. University of Oulu, Finland. An efficient instrument to measure freezing points of insects.

A widely used technique to study one aspect of cold resistance (which may play a role in winter resistance) is to determine the freezing point (also called supercooling point) of a biological specimen. Conventionally, the

freezing point of one individual is measured by one channel of a recorder in one run. Gradual cooling of an object is followed by a small thermoelement, and the freezing is seen as a sudden increase in the temperature. Here I present a modification which significantly increases the working capacity of a recorder, an expensive essential part of most methods. My purpose is to point out that our knowledge on the winter resistance of *Drosophila* species is really poor, and it can be improved significantly with easy and cheap methods.



Thermoelements with very small tips are soldered from 2 x 0.1 mm copper-constantane double wire. Ten (or even more) of them are connected in parallel, and two such groups are connected oppositely parallel via a thicker copper cable to a 0.5 mV recording channel. The voltage of this circuit approximates zero in all temperatures, until a fly (or pupa) in contact with one of the thermoelement tips freezes. At

this moment, a short peak is seen in a slowly running (0.5 mm/min) recording paper. The peak is either negative or positive depending on the group, which the frozen fly belongs to. The individuals within groups cannot be identified. This circuit does not measure the temperature, but a separate sensor must be built into the device. This will occupy one channel of a recor-