

metric investigations, in which a temperature gradient exists between the immersed extremity and the calorimetric bath.

(3) The equation of conduction of heat

$$Q = K(T_1 - T_2)A/D \cdot t$$

is applicable to calorimetric studies of the extremities.

(4) The rate of increase (K_s) of the temperature of the calorimeter and contents due to the peripheral or surface circulation is given by the expression

$$K_s = \frac{1}{t_1 - t_2} \cdot \log_{10} T_2/T_1$$

(5) Analyses of the experimental results made by the use of this equation, in which $\log_{10} \Delta T$ is plotted as ordinate relative to the time, t , as abscissa, show that there are two distinct portions: (1) that given by the transfer or elimination of heat by virtue of the temperature gradient existing between the foot and the calorimetric bath due to the inherent heat capacity or *tissue heat* of the extremity plus the effects due to surface circulation and (2) that given by the transfer or elimination of heat due solely to *circulatory conditions at or near the surface*.

(6) From a study of normal persons under various conditions of environmental temperature and under the régime of experimentation which has been adopted, there is evidence that (1) the rate of transfer or elimination of heat due to the surface or peripheral circulation *per se* is very approximately directly proportional to the temperature, in degrees Centigrade, of the surrounding environment; (2) the inherent thermal capacity of the superficial or surface layers of the extremity increases proportionately to the square of the temperature in degrees Centigrade of the surrounding atmosphere or environment, and (3) when the temperature of the surrounding environment reaches approximately 15° C. the rate of transfer of heat from the exposed surface of a resting human body becomes negligibly small, as is indicated by the value of the rate of elimination of heat due to the existing conditions of surface circulation.

(7) A comparison of data on the inherent thermal capacities of extremities in normal subjects, in cases of polycythemia and of thrombo-angiitis obliterans (Buerger's disease) shows that there is but little difference in general between that in normal subjects, and that in cases of polycythemia, but that there is a marked difference between the values in Buerger's disease and those obtained in normal subjects.

(8) A study of the rates of elimination of heat at the surface of an extremity due to conditions of surface circulation indicates that this rate of heat elimination may be from two to five times as great in cases of polycythemia as in the normal subjects under similar environmental temperature and, again, about

half as great in cases of thrombo-angiitis obliterans (Buerger's disease) as in normal subjects.

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CHROMOSOME VIII IN MAIZE

THE *Pr pr* factor pair, which modifies aleurone color in maize from red to purple, has long been known and has been used extensively in linkage studies. All the published data as well as my own unpublished results indicate that this factor pair does not belong to any of the seven linkage groups in maize which have already been reported. At least five factor pairs, of which four are new and have not previously been described, have been found by the writer to be linked with the *Pr pr* factor pair. A brief description of each of these factor pairs as they are expressed in the soma follows:

(1) *Bm bm*, a factor pair, which, when homozygous recessive, causes a water-soluble, yellowish-brown pigment to develop in the cells of the midrib and sheath of the leaves. This character comes into expression when the plant is about six weeks old and persists throughout the remainder of the life of the plant. This linkage relation was first observed in the summer of 1923. Backcross data from plants grown in 1925 substantiated this linkage and showed a crossing over value between *Pr* and *Bm* of 20 per cent.

(2) *Sc₁ sc₁*, a factor pair for scarred endosperm, as described in the University of Missouri Agricultural Experiment Station Research Bulletin 52.

(3) *Ft₂ ft₂*, a factor pair for a fine striping of the chlorophyll, which appears in young seedlings and persists through the life of the plant. The character expression varies from a pure albino, on the one hand, to a nearly green plant, on the other, with plant vigor roughly proportional to the amount of chlorophyll bearing tissue.

(4) *Yg yg*, a factor pair, which, when homozygous recessive, causes the seedling as well as the growing plant to be distinctly yellowish-green in color, due to a deficiency in the chloroplastid pigments. As these plants approach maturity, it becomes increasingly difficult to distinguish them from normal green plants.

(5) *Tn tn*, a factor pair, which, when homozygous recessive, produces a small slender plant with a usually very small ear shoot, a small unbranched tassel, and leaves which are always strongly tinged with anthocyanin.

This group of linked factors is especially interesting in that it represents a new chromosome in maize, to be designated as chromosome VIII.

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