A PHYSIOLOGICAL BASIS FOR THE DIFFERENTIAL RESISTANCE OF THE TWO RACES OF RED SCALE TO HCN[1]

THERE has been considerable interest in the two physiological races of red scale, *Aonidiella aurantii* (Mask.), since their discovery by Quayle.[2] This particular study has to do with the physiological basis of the resistance or non-resistance to HCN fumigation. Two pure strains were very kindly furnished by Dr. D. L. Lindgren[3] of Riverside. The last instar females were carefully removed from the host, either squash or grapefruit, prior to fertilization and placed in a closed chamber under the microscope and the spiracles carefully observed while several dilutions of HCN were admitted to the chamber. In all, 46 females of the resistant race and 17 females of the non-resistant race have been studied. There is no observable difference in the structure of the spiracles of the two races. There are two apparent positions of the inner structure of the spiracles. Testing with oil has shown that in one position the spiracle is closed and in the other it is open. The opening and closing are concurrent with a pulsation of the tracheal trunk. In the normal insect the tracheal trunk pulsates from the open to a partly closed position about 60 times a minute. On admitting HCN to the chamber the behavior of the spiracles of the two races is markedly different. In each race the spiracles close within three to five minutes after the cyanide reaches them. In the resistant race the spiracles remain closed as long as HCN is present for at least 30 minutes. In the non-resistant race the spiracles remain closed for only about one minute and then open and death follows in a short time if the cyanide concentration is lethal. The resistant scale can survive a lethal concentration of cyanide for at least 30 minutes. The closure of the spiracle was tested in each doubtful case by placing a drop of oil upon the insect. The oil penetrated readily if the spiracles were in the open position but did not penetrate when they were in the closed position. The five resistant individuals which failed to maintain closure of the spiracles during fumigation were known to have been injured during removal from the host. There seems no doubt but that the relative ability to maintain closure of the spiracles is sufficient to explain the difference in resistance to HCN of the two races. This study and others now in progress to determine the possible existence of a difference in the cyanide insensitive respiration and also the effect of other substances on spiracular closure will be reported in full elsewhere. A material which would cause failure of closure would be of the utmost practical importance.

N. F. HARDMAN
RODERICK CRAIG

UNIVERSITY OF CALIFORNIA,
BERKELEY

[1] Division of Entomology and Parasitology, University of California, Berkeley, California.
[2] H. J. Quayle, *Jour. Econ. Ent.*, 15: 400–404, 1922.
[3] D. L. Lindgren, *Hilgardia*, 11: 5, 213–225, 1938.

PALM PATTERNS AND HANDEDNESS[1]

INVESTIGATION of the handedness and palmar dermatoglyphics of the members of twenty-six families reveals an association within families between pattern D in the fourth interdigital area and functional handedness. Within fifteen of these families variations occur in respect to both traits. The following combinations of the two traits appear within the 348 paired sibs.

Concordant in handedness and pattern D	145 pairs
Concordant in handedness, discordant in D	64 pairs
Discordant in handedness, concordant in D	68 pairs
Discordant in handedness and D	71 pairs

Analysis of these data in a 2×2 table gives a Chi square value of 14.8, a highly significant figure. Thus sibs are much more likely to be alike or unlike in respect to both traits than they are to be alike in one and unlike in the other.

In the general population pattern D occurs with equal frequency in both right and left handers. In the twenty-six families studied, no significant relationship exists between handedness and sex or pattern D and sex. These findings would seem to eliminate pleiotropy and sex-linkage as the agencies responsible for the association. Autosomal linkage between factors responsible for handedness and the formation of pattern D appears to be the most likely cause of the association. The investigation will be continued with a large number of additional famiiles.

DAVID C. RIFE

THE OHIO STATE UNIVERSITY

THE EARLY USE OF IMPLANTED ELECTRODES FOR STIMULATION OF THE CORTEX CEREBRI

AFTER we had made more than one report on the results of cortical stimulation with implanted electrodes[1] with a method that was evolved from those of Loucks,[2] and Chaffee and Light,[3] and Mussen,[4] there came to my attention the "Method of Ewald"[5] as used

[1] This investigation was made possible by a grant from the National Research Council.
[1] J. W. Ward and S. L. Clark, *Arch. Neur. and Psychiat.*, 38: 927, 1937.
[2] R. B. Loucks, *Jour. Comp. Psychol.*, 16: 439, 1933.
[3] E. L. Chaffee and R. U. Light, SCIENCE, 79: 2048, 299, 1934.
[4] A. T. Mussen, *Arch. Neurol. and Psychiat.*, 31: 110, 1934.
[5] J. R. Ewald, *Vereins-Beilage*, 25: 180, 1898.