THE ROLE OF FUR IN HEAT REGULATION IN THE GUINEA PIG[1, 2]—This study was conducted to ascertain the effectiveness of guinea pig fur as an insulator. Five male guinea pigs, of 500 to 520 grams weight were obtained from a commercial breeder and received identical care until used in the experiment. Commercial rabbit food, supplemented with oranges and lettuce, was available *ad libitum*.

The experiments were conducted in a cold chamber held at a temperature of 6° C. and relative humidity of 45 per cent. Rectal temperatures were taken with a thermistor inserted to a constant depth of 8 centimeters. Rectal temperatures were recorded at 10-minute intervals until they coincided with the ambient temperature.

Before the animals were placed in the cold chamber, three of them were killed by breaking the neck. The body and leg fur of one animal had been removed with a commercial depilatory prior to killing. Another animal was skinned immediately after it was killed. The third was placed in the chamber with its fur intact. Of the two live animals placed in the chamber, the body and leg fur of one had been removed with a commercial depilatory prior to placement in the chamber.

The research was conducted in accordance with the "Principles of Laboratory Animal Care" of the National Society for Medical Research.

By plotting the rectal temperatures against time, cooling curves were obtained which indicate an over-all decrease in rectal temperatures from 38.5° to 6° C (figure 1). The normal-coated live animal was considered to be the control. Any difference in the rate of cooling from that of the control is considered to be an indication of the effectiveness of the insulating material.

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[2]Manuscript received April 23, 1966.

The hairless dead animal lost heat 1.5 times as fast as the control. The skinned dead animal lost heat 4 times as fast as the control. These data are in general agreement with the insulation qualities found for fur of other animals (Scholander, 1950; Mayer and Nichita, 1929).

The two live guinea pigs in this experiment, when compared with their dead counterparts, showed increased resistance to heat loss. However, a critical temperature was reached at which the live animals died. A sharp break was produced at this point in the cooling curve for both normal-coated and hairless animals. Below this point, the rate of cooling increased, so that the curve of the cold-killed animal coincided with the cooling curve of the initially dead, normal-coated animal.

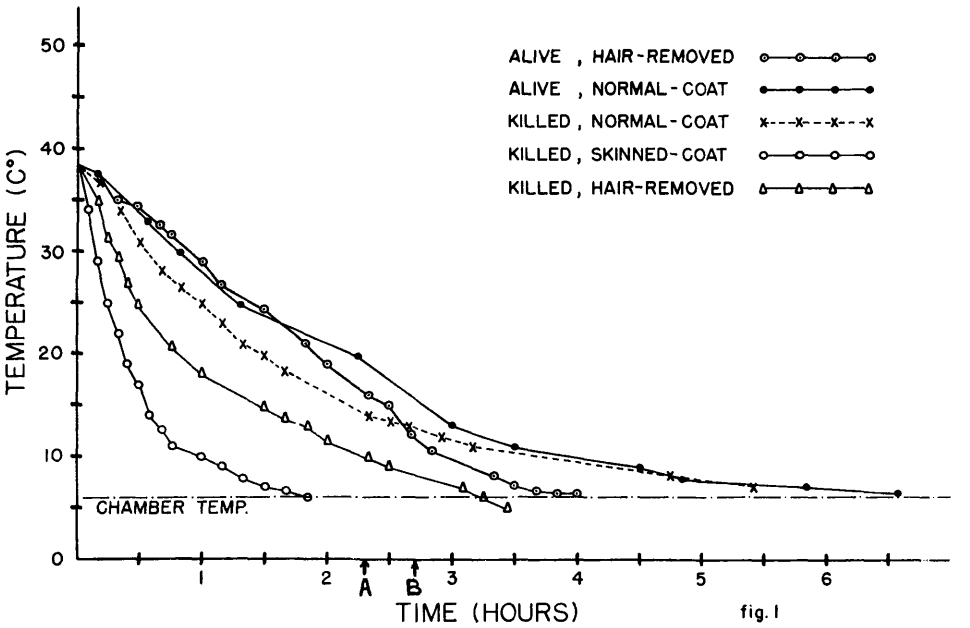

FIGURE 1. Rectal temperatures plotted against time. Arrow A indicates time of death of "alive, hair removed" animal; arrow B identified time when "alive, normal coat" animal died.

The results of this study indicate that guinea pig fur plays an important role in decreasing heat dissipation and that the fur is an important factor in maintaining this species' homeothermic balance.

This study of the insulating value of fur and skin in guinea pigs shows differences between live guinea pigs with intact coats and with clipped fur, dead guinea pigs with intact coats and with clipped fur, and dead, skinned guinea pigs when exposed in a chamber held at 6° C. Live animals with intact coats lost heat most slowly; dead, skinned animals lost heat most rapidly; rates of heat loss in others were intermediate.—RICHARD D. GILCHRIST and CHARLES G. WILBER, *Kent State University, Kent, Ohio* and *University of Delaware, Newark, Delaware.*

REFERENCES

Mayer, A. and G. Nichita. 1929. L'eu emise par vaporisation et ses rapports avec les echanges respiratoires. Le rapport H_2O/O_2 Etude ser le lapin. Ann. Physiol. 5: 777–841.

Scholander, P. F., R. Hock V. Walters, F. Johnson, and **L. Irving.** 1950. Heat regulation in some arctic and tropical mammals and birds. Biol. Bull. 90: 237–258.