

along the border of the left ventricle. As the intraventricular tension abruptly rose in the isometric phase of systole the weakened myocardium at the site of the infarct passively expanded (outthrust), while the normal region of the ventricle contracted (in thrust) (Fig. 1B). This phenomenon was also observed in 3 cases of ventricular aneurysm. Occasionally the reversal of pulsation was not complete but appeared as a definite lag of systolic in thrust or as a double systolic pulsation.

Localized impairment of contraction was observed in 23% of the cases. This appeared as a marked diminution or absence of pulsation (Fig. 1C). These changes may occur in a region where the infarcted myocardium is not sufficiently powerful to contract vigorously but is able to withstand the intraventricular pressure.

These localized abnormalities in pulsation have not been observed by us in normal individuals or in those with other types of heart disease than coronary artery disease. The pulsations are occasionally much diminished, or even absent, in the apical region when the heart is markedly enlarged, but such cases were not included in the present series.

In this report we have presented the abnormalities in contraction of the left ventricle as observed in the postero-anterior view alone. In addition, the movements of the postero-lateral wall of the left ventricle in myocardial infarction are being studied in the left oblique and left lateral positions.

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Basal Heat Loss and Production in Women at Temperatures From 23°C to 36°C.

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Recent work^{1, 2, 3} on the effect of environmental temperature on heat loss in humans has been restricted to male subjects, most of them

¹ Hardy, J. D., and Du Bois, E. F., *J. Nutrition*, 1938, **15**, 461.

² Winslow, C.-E. A., Herrington, L. P., and Gage, A. P., *Am. J. Physiol.*, 1937, **120**, 1.

³ Hardy, J. D., and Soderstrom, G. F., *J. Nutrition*, 1938, **16**, 5, 493.

TABLE I.

Subject Symbol	Age	Height, cm	Weight, kg	Surface Area, m ²
○	35	175	64.0	1.77
△	24	162	59.5	1.62
□	26	165	54.5	1.60

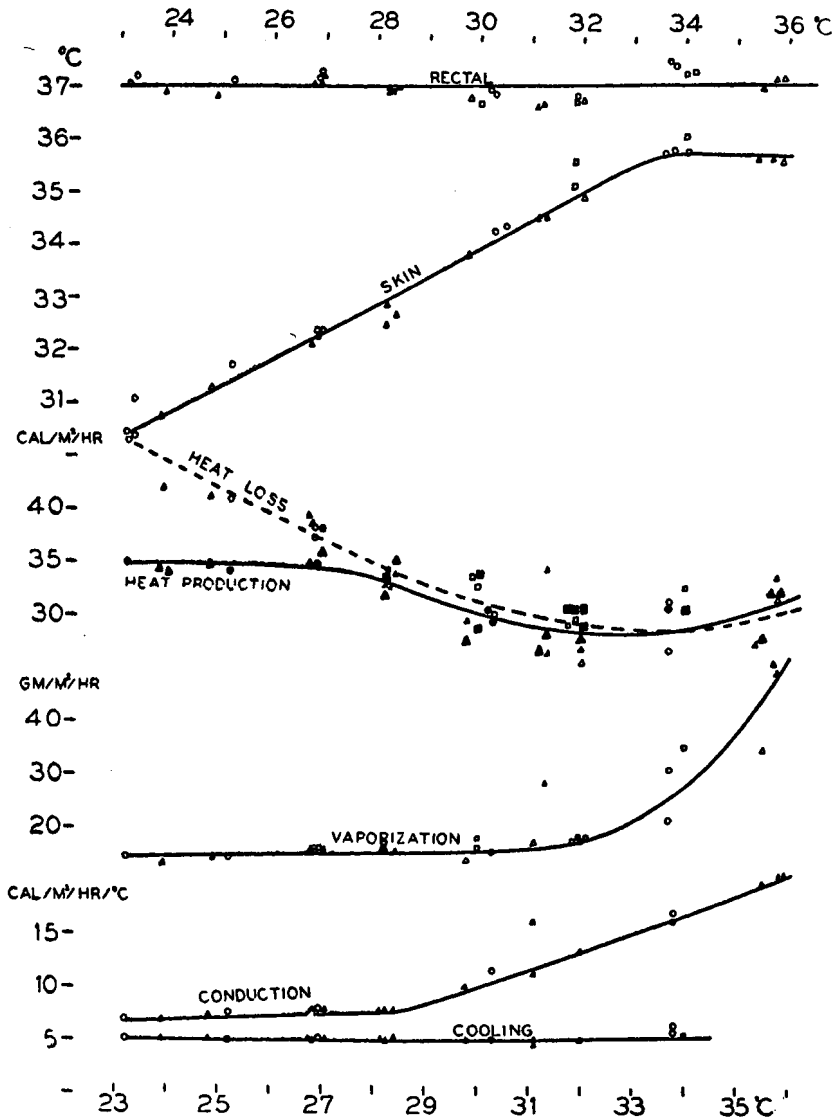


FIG. 1.

Experimental data for three subjects plotted against calorimeter temperature. (Solid symbols: Heat production.)

nude. The present report deals with similar studies on 3 normal women (nude). The methods were similar to those previously described.¹

The data are presented in Fig. 1, in which all variables are plotted as functions of the calorimeter temperature.

1. *Rectal Temperature* was about 0.15°C lower at 24°C than at 36°C .

2. *Average Skin Temperature* increased linearly with calorimeter temperature between 23°C and 33°C . These changes in skin temperature were due entirely to changes in the calorimeter temperature. At 33°C the skin temperature reached a high level and did not change with further increase in calorimeter temperature.

3. *Heat loss* decreased linearly with increasing calorimeter temperatures up to 31°C , and after reaching a low point of $29\text{ cal/m}^2/\text{hr}$ at 32°C rose slowly with higher temperatures.

4. *Heat production* was constant between 23°C and 27°C at $35\text{ cal/m}^2/\text{hr}$. At 28°C , the heat production began to decrease slowly, closely following the heat loss. At 32°C - 33°C a low point in heat production, $29\text{ cal/m}^2/\text{hr}$ was reached after which the heat production again increased following closely the heat loss. This change in heat production was observed in all 3 subjects and amounted to over 17% of the 35 calorie level.

5. *Vaporization* was practically constant between 23°C and 32°C . Sweating began between 32°C and 33°C . In this zone evaporation was that necessary to balance heat loss and heat production.

6. *The conduction* of the peripheral tissues was almost constant between 23°C and 28.5°C , and had a value corresponding to a thickness of tissue of 22 mm. The conduction increased linearly with temperature from 28.5°C to 36°C . Thus blood flow in the superficial tissues increased in proportion to the rise in environmental temperature.

7. *The cooling constant* of Newton's law was $5.3\text{ cal/m}^2/\text{hr}/^{\circ}\text{C}$ and did not change throughout the experimental range. The constancy of this figure is a check on the heat loss, calorimeter temperature, skin temperature, and amount of activity of the subject.

Fig. 2 shows a comparison between the present data and those previously reported on male subjects. While the rectal temperatures and the Newton's law cooling constants were identical, there were significant differences in the responses of the men and women to temperature changes.

The skin temperature of the women was higher in the warm atmosphere and lower in the cold than that of the men. The dif-

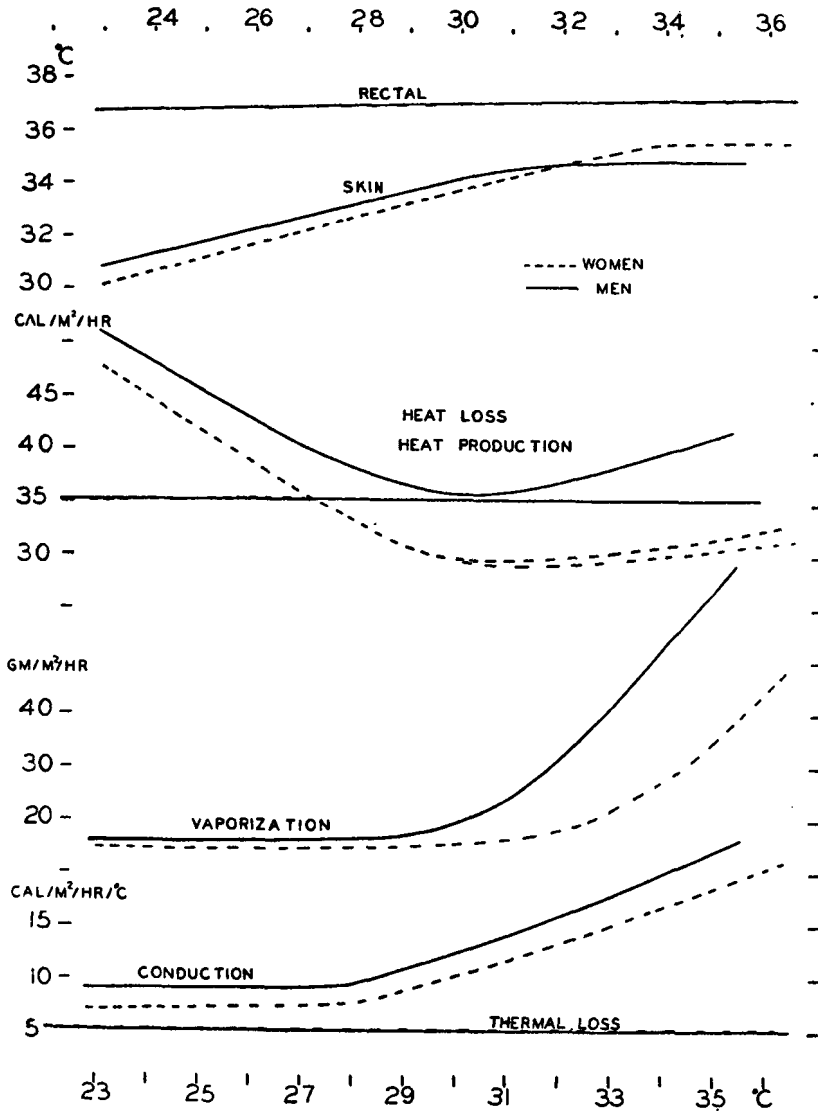


FIG. 2.
Comparison of responses of men and women to environmental temperature.

ference at the higher temperature is accounted for both by the level of skin temperature required to induce sweating and by the amount of sweat. The women did not begin to sweat until the calorimeter temperature was 2 degrees above the threshold for sweating in the men, and the amount of sweating was less. The lower skin temperature of the women in the cold is apparently due to a thicker insulating layer of superficial tissue. This view is verified by the

differences in the heat loss per unit area and in the tissue conduction. The heat production for the men and women was the same up to 27.5°C, but in contrast to the men, the women showed a significant decrease in heat production at temperatures above this level.

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Quantitative Study of Effect of Transfusion of Blood on Plasma Prothrombin.*

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It is established that the bleeding tendency in obstructive jaundice and biliary fistula is due to a lowering of the plasma prothrombin. Both on clinical¹ and experimental² grounds, blood transfusion is known to effect temporary improvement in the hemorrhagic state. Warner, Brinkhous and Smith² have shown in dogs with a biliary fistula of long duration that after a blood transfusion there is a temporary rise in plasma prothrombin with a cessation of bleeding.

The purpose of this report is to demonstrate in dogs that it is possible to determine quantitatively the prothrombin change which occurs following transfusion and that the change is purely one of summation.

The animals used as recipients were of 3 types: 2 animals were normal dogs, 2 were dogs with obstructive jaundice, and one was a dog with a cholecyst-nephrostomy.³ Normal dogs were used as donor animals. Plasma volumes before transfusion were determined by the vital red method.⁴ The plasma volume after transfusion was calculated by addition of the volume of transfused plasma to the pre-

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¹ Judd, E. S., Snell, A. M., and Hoerner, M. T., *J. Am. Med. Assn.*, 1935, **105**, 1653.

² Smith, H. P., Warner, E. D., Brinkhous, K. M., and Seegers, W. H., *J. Exp. Med.*, 1938, **67**, 911.

³ Kapsinow, R., Engle, L. P., and Harvey, S. C., *S. G. and O.*, 1924, **30**, 62.

⁴ Rowntree, L. G., and Brown, G. E., *The Volume of the Blood and Plasma*, W. B. Saunders Company, 1929.