TABLE III.

Local Sensitization of Guinea Pig Skin by Rabbit and Guinea Pig Antisera (Prepared Against Horse Serum).

Recipient D.

On the day following the intracutaneous injections indicated, 0.5 cc horse serum was injected subcutaneously on the belly.

	Preparation of sites		
Time	Rabbit anti-horse serum .15 cc 1:8 dil. in saline	Guinea pig anti-horse serum No. 3 .15 cc undil.	Normal G.P. serum .15 cc undiluted
37′	25x25 pink, markedly swollen	Trace	neg.
44′	26x26 pink, markedly swollen	19x16 pink, markedly elevated	,,
66′	color fading, markedly elevated	24x23, color slightly faded, well elevated	,,
overnight	Practically normal	Practically normal	,,

pneumococcus III serum did not show the effect.

It may be mentioned that no reactions were obtained in the skin of rabbits (on the ear or the back) in sites injected with rabbit or guinea pig immune sera.

It would seem probable that the reactions described are due to anaphylactic antibodies; so far it can be said merely that in guinea pigs which had received guinea pig antisera intraperitoneally lethal shock could be induced not only in the case of horse serum but also of ragweed.†

By testing several like antisera simultaneously in one recipient, the antigen being given subcutaneously, it is possible to evaluate their comparative strengths.

† Passive anaphylactic transfer with guinea pig anti-ragweed serum was demonstrated following intraperitoneal injection (6 cc) into a normal guinea pig of 330 g weight, typical shock and death ensuing within 4 minutes following intravenous injection of 0.5 cc "5%" extract on the next day. The extract was not at all toxic for a normal control.

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Alterations in Response to Changing Body Temperature Following Artificial Fever and Chilling.

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During investigations upon the temperature control of birds, modifications of both panting and shivering temperature thresholds due to artificial fever and chilling were studied. Both young and adult domestic fowls (*Gallus domesticus*) were first placed in an ice chamber in which the temperature averaged about 10°C, and then in a heating blanket in which the temperature averaged about 55°C. After a suitable recovery period, the order of the exposure was reversed, *i.e.*, the same bird was first warmed and then chilled. During these changes in body temperature, changes in breathing rate were recorded. Temperatures were recorded from sensitive thermometers placed to a constant depth in the cloaca and under the skin. The first muscular tremors preceding continuous shivering were detected by a stethoscope placed upon the muscles of the limbs and breast.

Eighty minutes were required to lower the temperature of a typical bird (Table I) one

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TABLE I.
Lowered Panting Temperature Threshold Following Chilling.

Time in min.	Cloacal temp. °C	Skin temp. °C	Environmental temp.°C	Breathing rate/min	Remarks
0	42.1	41.1	25.0	28/min.	
10	41.8	40.5	10.0	34	Muscle tremors
30	41.6	39.6	"	44	
60	41.2	39.6	"	36	Severe shivering
100	40.7	38.9	"	38	
135	39.1	37.6	"	36	
		Transferred to Heating Blanket.			
138	39.0	38.8	55.0	30	
150	39.3	40.2	"	28	
180	40.9	41.5	"	36	
195	41.7	42.3	"	60	Pre-panting rate
206	42.1	42.8	"	120	Panting rate

Condensed protocol showing a lowered panting temperature threshold in the domestic fowl after preliminary chilling.

TABLE II.
Depression of Shivering Following Warming.

Time in min.	Cloacal temp. °C	Skin temp. °C	Environmental temp. °C	Breathing rate/min	Remarks
0	42.0	41.4	25.0	36/min	
10	42.2	42.6	55.0	72	
20	42.7	43.2	"	160	Panting rate
40	42.9	43.3	"	152	
70	43.1	43.6	"	145	
		Transferred to Ice Chamber.			
72	43.0	42.6	10.0	96	Reflex inhibition
80	41.6	41.2	"	48	
90	41.0	40.2	"	28	
95	40.8	39.9	"	40	Muscle tremors
112	40.0	39.2	"	36	Severe shivering
130	39.6	38.6	"	36	
160	39.0	37.6	"	36	

Condensed protocol showing depression of shivering responses following preliminary warming in the domestic fowl.

degree. A total fall of 3 degrees was produced in 135 minutes. Shivering in the preliminary form of periodic muscular tremors appeared promptly and became more severe as chilling continued. The breathing rate increased somewhat upon exposure to the cold packs, and remained rapid throughout the period of chilling. After the body temperature had been maintained at a subnormal level for a short period, it was quickly raised to the normal level. As the body temperature approached normal however, breathing began to increase much as it does in birds approaching the lower threshold limit of panting. In fact, the rate became polypneic such as is characteristic of normal birds while panting by the time the original body temperature was reached. In other words, a lower panting temperature threshold was established. In many birds the panting rate was 6 to 8 times the normal rate when the body temperature was returned to the pre-chilling level.

To ascertain whether the threshold of shivering could be reciprocally affected by preliminary heating, the same birds were first placed in the heating blanket and later transferred to the ice chamber. Panting occurred after the deep cloacal temperature rose to the panting threshold, increased to a maximum rate, and then decreased to a slightly slower rate. After a period of 50 minutes of hyperthermia the birds were transferred to the ice chamber. The breathing rate decreased suddenly from 145 to 96 breaths per minute, even before the deep cloacal temperature had started to fall indicating definitely reflex inhibition of panting. The body temperature quickly fell to the normal level, and continued

TABLE III.
Panting and Shivering Responses Before and After Artificial Fever and Chilling.

Bird No.	Starting temp.°C	(High) (Low) temp. °C	Length of exposure	Normal panting threshold	After chilling	Normal shivering threshold	After heating
Domestic Fowl							
50	41.4	44.7	45 min.	42.3	41.2		
		38.0	90			39.3	37.1
46	42.0	43.8	73	42.4	41.7		
		40.6	125			42.0	41.5
47	42.4	44.8	70	43.2	41.8		
		40.2	150			42.3	40.6
49	41.4	45.0	55	42.8	40.3		
		38.8	70			40.7	37.8
45	42.0	43.1	70	42.7	42.0		
		39.0	138			41.7	40.8
Pigeons							
A	41.6	45.0	30	42.4	40.6		
		37.5	50			40.6	38.5
D	42.2	44.7	65	43.1	40.8		
		22.0	135			41.5	40.9

to fall an additional 3 degrees in 85 minutes, this fall corresponding to a similar fall in 135 minutes in the same bird without preliminary heating. Shivering was delayed and did not become severe until a threshold considerably below that of the normal bird was reached. (Table II.)

Discussion. It is thus indicated that as a result of previous chilling, the "panting thermostat" is reset at a new and lower level so that the panting rate of breathing is initiated at temperatures below the normal level (Fig. 1). After preliminary heating, shivering is delayed and does not reach the same intensity as that of the normal bird. Heat therefore actually depresses the sensitivity (raises the threshold) of the shivering mechanism, resulting in a more severe and rapid fall of body temperature. Table III summarizes these alterations as well as the limits of variation in several birds chosen as typical of all experiments.

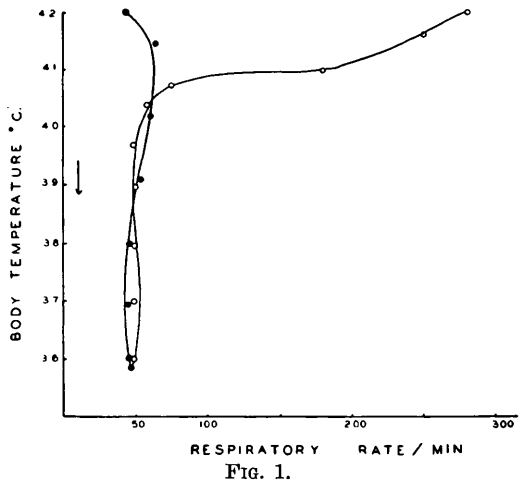

FIG. 1.

Alteration of the panting mechanism following severe hyperthermia, as demonstrated by a lowered panting temperature threshold. Note that panting begins on the ascending limb of the curve between 40° and 41°C but was absent on the descending limb at 42°C. Solid circles indicate decreasing body temperature; open circles indicate rising temperature.

Summary. Alteration of the temperature regulating mechanism of the fowl has been demonstrated by a lowered panting temperature threshold following a maintained reduction of body temperature (3 degrees for 2 hours). Maintenance of body temperature in a condition of hyperthermia for 1 to 2 hours previous to chilling does not result in a reciprocal change in the shivering threshold, rather, heat acts as a depressant and decreases the sensitivity of the shivering mechanism under these conditions. Reflex inhibition of panting with application of cold to the skin is demonstrated.