

## DIURNAL VARIATIONS IN THE TEMPERATURES OF CAMELS.

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In October, 1907, I had the opportunity of taking the temperatures, on various occasions, of a certain number of 500 camels recently imported from India, and quarantined in the north-west of Western Australia, on an open spinifex (*Triodia*) plain. The days were usually hot (often over 100°F. in the shade), and the nights decidedly cool. The results, though comparatively few, seem to indicate that the camel resembles, to some extent, cold-blooded animals such as reptiles, inasmuch as there is a wide range of temperature, varying with external conditions, the oscillations sometimes being as much as nearly 8°F.

The low temperatures, it will be noted, occurred, as was to be expected, in the morning, and they only gradually rose as the day became warmer. Further, the animals, before these temperatures (always rectal) were taken, were often restless and eager to be off in search of food, and had not necessarily just awakened from sleep. The subnormal temperature would appear to be due to the coolness of the morning, the lack of active exercise with its metabolism, and perhaps also to the completion of rumination some time previously.

The higher temperatures found in the evening, after hot days, are perhaps to be attributed, in great measure, to the fact that camels visibly "perspire" only over a small area on the back of



the neck. This area would seem to be far too small, considering the bulk of the animal, to assist materially in coordinating the body-heat to a constant mean temperature in the presence of great solar heat and muscular exercise; and hence the keeping down of the temperature, under these conditions, must depend chiefly on invisible perspiration and vaso-motor processes. This small amount of visible perspiration, by conserving the animal's water-supply, is doubtless of great advantage to a creature inhabiting arid regions.

It may be of interest also to bear in mind, in connection with this reptilian temperature-trait, the fact of the oval shape of the red corpuscles of camels, which, though not nucleated, thus far also resemble those of reptiles and birds. One cannot see any actual relation between these two reptilian traits in camels. The camel, being a ruminant, has presumably evolved along with other ruminants, and, in consequence, its ancestry must be supposed at one time to have possessed round corpuscles like other ruminants, and so on, dating back to marsupial or premarsupial times. The appearance, then, of an oval corpuscle would seem to indicate either an atavistic (or rather reversionary) phenomenon, or a new evolutionary departure suiting the structures of the animal. Recently the view has been propounded that the appearance of one reversionary character, or of some new departure, may be associated with others not apparently related to it; and that, by artificial selection, an attempt to breed a stock containing the one will lead to the production of a race in which both are stable. Can the appearance of the one trait, being of use to the animal in some way, by natural selection have rendered the other permanent also? On the other hand, what conceivable advantages can there be to camels to possess either oval red cells, or a temperature varying considerably with their external surroundings? Perhaps the soundest view to take will be to consider the oval red corpuscles as having arisen by a pure mutation, of no particular economic value even physically, and the oscillations of temperature as the result of a successful attempt to conserve water.



The following are some of the results found :—

Camel Table i.

88.	About 6 p.m. Oct. 10th,	100° F.	About 7 a.m. Oct. 11th,	94·4° F.
91.	„	99·4° F.	„	96·1° F.
93.	„	101·4° F.	„	94·2° F.
96.	„	99·7° F.	„	95·7° F.
100.	„	100·2° F.	„	94·2° F.

Table ii.

To show the gradual rise in temperature amongst 36 camels tested consecutively as the day rapidly increased in warmth, from 8 to 10 a.m. on October 12th.

Camel.	T.°F.	Camel.	T.°F.
75.	95·5	80.	97·1
69.	95·4	74.	96·2
9.	96·7	38.	97·2
13.	95·5	28.	97
3.	96·2	40.	95·1
59.	96·4	8.	96·1

Average of 6=95·95° F.

Average of 6=96·58° F.

Camel.	T.°F.	Camel.	T.°F.
27.	96·5	25.	96·4
66.	96·6	4.	95·2
56.	96	29.	96·4
1.	95·6	55.	98·4
24.	94·8	44.	96·5
12.	97·4	33.	25·8

Average of 6=96·15° F.

Average of 6=96·62° F.

Camel.	T.°F.	Camel.	T.°F.
18.	96·7	41.	96·1
32.	95·5	37.	97
71.	96·2	43.	98
43.	96·3	41.	97·2
65.	96·5	43.	98
52.	97	36.	98·8

Average of 6=96·38° F.

Average of 6=97·64° F.

(Note.—The intervals between the taking of the temperatures in the last batch of six camels were much greater than in the previous batches on account of these animals having to be searched for in a mob of 87.)

Table iii.

To show the effect of fever (Trypanosomiasis, Surra) in a camel, modified by the diurnal variation.

Evening of Oct. 10th—Average T. of 13 healthy camels,  $100.07^{\circ}\text{F}$ .

T. of surra camel,  $102^{\circ}\text{F}$ .

Morning of Oct. 11th—Average T. of 5 healthy camels,  $94.9^{\circ}\text{F}$ .

T. of surra camel,  $99.4^{\circ}\text{F}$ .

Evening of Oct. 11th—Control camel,  $101.8^{\circ}\text{F}$ . T. of surra camel,  $104^{\circ}\text{F}$ .





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