sinus, it seems pretty certain that the systoles of that part are also primarily due to its muscular tissue, and not to the nerve-cells in it. Recent researches seem to show that all contractile tissue has primitively a tendency to contract rhythmically; and we may perhaps regard the phenomena above described as due to a greater retention of this property in the muscle-fibres of the venous sinus of the tortoise-heart, as compared with those of the ventricles, which have been so modified for the purpose of rapid and powerful contraction as to interfere with the manifestation of the fundamentally inherent tendency to exhibit so-called spontaneous rhythmical beats.

The concluding portion of Gaskell's paper is concerned with the action of a weak, interrupted current upon certain functions of the cardiac muscle, and its resemblance to the action of the vagus nerve. He had already proved, so far as the frog is concerned, that stimulation of the vagus might, under various circumstances, produce directly opposite results, which may be arranged in pairs. It may cause, 1°, Slowing or acceleration of the rhythm; 2°, Diminution or increase of the force of the contractions; 3°, Diminution or (possibly) increase of tone. From subsequent work with the tortoise-heart, he now adds, 4°, Diminution or increase of conductivity in the cardiac muscle. As a corollary to the latter, is to be added the influence of vagus stimulation upon sequence of beats in the successive heart-cavities. When an artificial hindrance to conduction in the cardiac muscle (as by clamping) is interposed, vagus stimulation may either entirely check the transmission of the wave of contraction, or may facilitate it; and similarly it may shorten or lengthen the time-intervals between the contractions of successive heart-chambers. The initial effect of vagus stimulation is often to depress some function: its final and most enduring power is to exalt, intensify, and repair that function. It slows rhythm, but its stimulation makes rhythmic beats last longer than they otherwise would. It diminishes at first the force of the contractions, but its ultimate effect is to improve and sustain the contractile force. It may primarily diminish conductive power, yet in the end it completely restores that power. Gaskell concludes that *the vagus is essentially the trophic nerve of the heart.*

All the above results of vagus stimulation are repeated exactly when an interrupted current not powerful enough to cause contractions is sent through an isolated strip of the apex of the ventricle of the heart of the tortoise. Further: atropine applied to this strip prevents the action of the interrupted current upon it, just as this drug prevents the action of the vagus upon the whole heart. Since the strip contains no nerve-cells, the interrupted current must act directly upon the muscular tissue. Hence it is made probable that the vagus nerve also immediately influences the cardiac muscle without any necessary intervention of nerve-cells; and also that atropine exerts its well-known influence upon the heart, not, as has hitherto been generally assumed, by acting upon the ganglia in that organ, but by immediately influencing the properties of its muscular tissue.

H. NEWELL MARTIN.

THERMOMETER EXPOSURE.

SOME may have been misled by a note on thermometer exposures of the signal-service, which appeared on p. 156 of SCIENCE. The subject is by no means so simple as that note would seem to indicate. Results of temperatures observed in the same neighborhood vary greatly. That the heat of a city, caused by the burning of coal for heating and manufacturing purposes, can affect the temperature of the air an appreciable amount, will be seen to be hardly tenable when it is considered that a breeze of five to ten miles per hour (which is a very light one) will entirely remove the air in the city each hour; that the number of flues by which the heated air is carried out is exceedingly small as compared with the whole atmosphere over the city; lastly, that reliable observations taken in the city and adjacent country show that no such effect is noticeable. Of the last, any one can satisfy himself by consulting observations made in Central-Park observatory and the Signal-office in New-York City. Both of these observatories are fitted up with the very best instruments, and the records may be regarded as reliable as any in the country. The observations for 1878 for the first-named station have been published in the annual report of the New-York meteorological observatory, and, for the second station, in the reports of the chief signal-officer for 1878 and 1879. The following figures show maximum and minimum temperatures for each month of 1878:—

1878.	MAXIMUM.		MINIMUM.	
	Central Park.	Signal-Office.	Central Park.	Signal-Office.
January	51°	51°	7°	9°
February	56°	57°	7°	10°
March	69°	68°	13°	13°
April	76°	75°	42°	40°
May	84°	81°	40°	41°
June	89°	88°	49°	47°
July	94°	94°	63°	61°
August	90°	89°	59°	59°
September	90°	86°	45°	45°
October	80°	78°	39°	39°
November	60°	59°	29°	28°
December	60°	58°	13°	12°
Mean	74.9°	73.6°	33.8°	33.7°

When it is considered that these stations are in such diverse surroundings, with different exposures of instruments, and widely different positions as respects the sea, the above agreements can but appear very remarkable. Abundant similar facts may be easily found. Undoubtedly there are great differences of temperature in the same city or village, due to currents of cold air coming down valleys, differences of exposure of instruments, proximity to large bodies of water, and innumerable other causes exceedingly difficult to guard against. If any one has a doubt as to the uniform results obtained by the signal-service, a glance at the weather-map any day will convince him that isotherms can readily be drawn by using the observations made by the service. If it be claimed that these temperatures on the Atlantic seaboard are too high, it will, at the same time, be seen that this is due in large measure to the proximity of the cities to the sea; and it is necessary to establish the stations there to meet the needs of seafaring men. Experiments are being carried on in England in order to determine the proper manner of exposure of thermometers. Certainly the continental method of placing thermometers at four feet from the ground will hardly give proper temperatures in the spring and autumn in the northern United States so long as there is snow on the ground. What are needed are definite results from careful observations, and not indefinite or general expressions.