ing with moving trains with the same facility as between fixed points. The bridge is provided with a trolley wire for electrically lighting the trains. This wire, which was used in the telephone experiment, was connected with the train dispatcher's office and with the bridge offices, and upon the cars were placed arms provided with compound brushes which touched the trolley wire. The circuit was completed through the car truck and track rail, the connection between the circuit wires and truck being completed by a brush resting on one of the car wheels.

The compound brush consisted of a number of brushes of brush copper fastened together with intermediate pieces of soft rubber. The brushes being electrically connected with each other and with the telephone wire, arranged in this way, unbroken conversations could be carried on while the trains moved along. The electrical contact of the compound brush with the trolley wire was so perfect that the sliding of the brush on the wire produced no noticeable effect.

It is proposed to permanently equip the cars with telephones and to provide a suitable electric conductor on the bridge in convenient position for contact with the brushes carried by the cars.

THE THERMOPHONE.

The thermophone is an instrument for measuring temperature, particularly the temperature of a distant or inaccessible place. It was devised by Henry E. Warren and George C. Whipple, in 1894, for the purpose of obtaining the temperature of the water at the bottom of a pond. The first experiments were so successful, says the Progressive Age, that they were encouraged to study further into the capabilities of the instrument, with a view to adapting it to various scientific and commercial uses. These studies led them to believe that the thermophone is an instrument of great value, not only for obtaining deep sea temperatures, but for many meteorological and scientific purposes.

The apparatus which is here presented for inspection resembles Siemens' resistance thermometer more than any other. It takes advantage of the fact that different metals have different electrical temperature coefficients. The accompanying diagram illustrates the general arrangement.

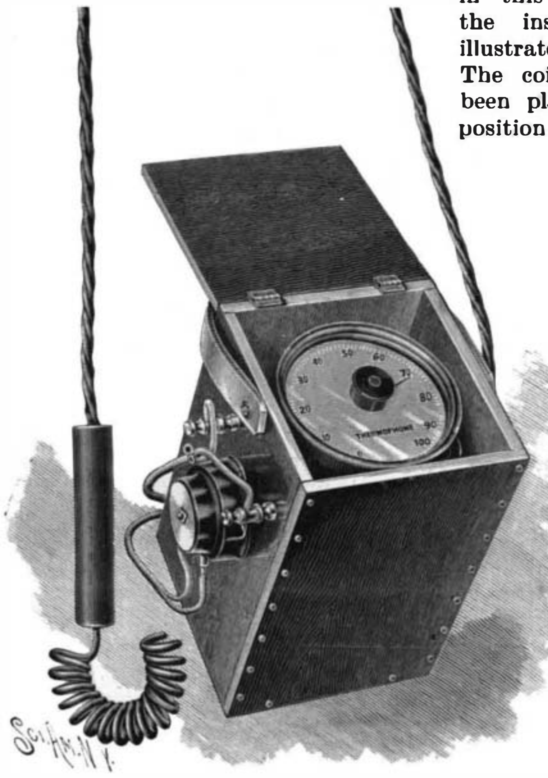
A and B are coils of different metals placed in proximity and joined together as shown in the figure. These coils are connected with a slide wire, CD, by means of the leading wires, L and L'. The two ends of CD are connected in circuit with a battery, M. A galvanometer, G, is put into a leading wire connecting the junction of A and B with a movable contact, Y, on the slide wire. The galvanometer will indicate zero current when $\frac{A}{B} = \frac{CY}{DY}$. But A and B, having different temperature coefficients, will vary in resistance at different rates with changes in temperature; consequently there will be a different value of $\frac{A}{B}$ for every temperature. The value of $\frac{A}{B} = \frac{CY}{DY}$ may be directly read from a scale placed under the sliding contact, Y, or the temperature corresponding to the given ratios of $\frac{A}{B}$ may be marked upon the scale.

The slide wire is wound around the edge of a disk above which there is a dial graduated in degrees of temperature. The hand on the dial is directly over the movable contact on the slide wire, and both are moved by turning a knob in the center of the dial.

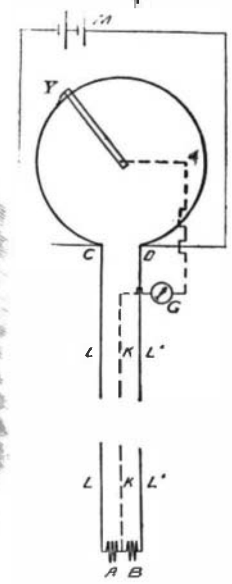
It is easily seen that the temperature of the slide wire, CD, has absolutely no effect upon the reading of the instrument, for being made of one piece of metal, which has the same temperature throughout its length, each portion of it will rise or fall in resistance at the same rate with changes in temperature; consequently the ratio of its parts will not vary. The effect of temperature changes on the leading wires, L and L', will not sensibly affect the reading for the same reason.

In place of the galvanometer it has often been found advisable to use a telephone, in connection with a circuit breaker, to show the presence of a current. It is in this form that the instrument is illustrated here. The coil having been placed in the position where the temperature is desired, the transmitter is taken from its hook on the left hand side of the box and held to the ear while the right hand of the operator turns the knob over the dial until a point is reached where no sound is heard. The dial hand then indicates the true temperature. If desired, a number of coils can be located permanently at a number of distant points and thrown into connection with central dial box, at will, by means of a little switch board; a scheme which might be valuable for practical application in a large gas works, as it would enable the superintendent to ascertain the temperature at any given set of points in the works at any time without his leaving his office or desk. This instrument, as we are informed, is more sensitive than a mercurial thermometer. It can be made with any desired range, and its readings are independent of pressure, an important feature in a deep sea instrument.

E. S. Ritchie & Sons, Brookline, Mass., are manufacturers for the United States and Canada.



THE THERMOPHONE.



THE FRILLED LIZARD—CHLAMYDOSAURUS KINGI.

The above named lizard inhabits the northern or tropical territories of the Australian continent, and is tolerably abundant in both North Queensland and the Kimberley district of Western Australia.

The habitat of the frilled lizard is essentially sylvan, its resort being the thickly wooded scrublands, and its favorite abiding place the trunks and lower limbs of the larger trees. The length of the finest examples rarely exceeds three feet, and of this the long, rough, though slender tail monopolizes the greater moiety. Living specimens exhibit a considerable individual color variation. The predominant hue of the body is pale brown with reticulated markings, while the frill, in the males more especially, is usually decorated with interblending tints of yellow, scarlet and steel blue.

No living example of this singular lizard had, up to the present year, been brought alive to Europe, a circumstance which will account, to a large measure, for the fact of certain abnormal phenomena connected with its life habits having hitherto attracted little or no scientific attention. Through the possession of living specimens of Chlamydosaurus in both Queensland and Western Australia, several interesting data concerning the species have fallen within my notice.

Having, furthermore, succeeded in bringing one out of several examples embarked safely to England, my presentation of the animal to the Zoological Society's Gardens, where it was on view for some weeks, has afforded many fellow naturalists the opportunity of verifying the phenomena here recorded. The most conspicuous structural feature of Chlamydosaurus kingi is the extraordinary development of the cuticle of the neck, that gives to it its popular title. This takes the form of a voluminous frill or collar, which, while the animal is at rest or undisturbed, is neatly folded in symmetrical pleats around the creature's neck and shoulders. No sooner, however, is the lizard excited to hostility by the approach of a threatening assailant, than, coincident with the opening of the mouth, the frill is suddenly erected, much after the manner of the unfurling of an umbrella, and stands out at right angles to the longer axis of the body, measuring under such conditions some seven or eight inches in diameter.

The mechanism by which the erection and depression of the frill of Chlamydosaurus is accomplished is intimately connected with a slender process of the hyoid bone, which traverses the substance of the frill on each side, and is so adjusted that the opening of the creature's mouth and the erection of the frill are synchronous operations. A characteristic photograph from life of this lizard in a condition of excitement, and standing at bay, with mouth open and frill erect, is afforded by Fig. 1, representing one of many I was fortunate in securing from the specimen I brought to England.

The function of the frill in Chlamydosaurus is, as apparently indicated by the circumstances and conditions under which alone it is displayed to view, purely that of a "scare organ," wherewith by its sudden expansion many of its would-be assailants are frightened and deterred from attacking it. Instances have, in fact, been recorded to me of dogs, which will readily rush upon and kill other and larger lizards, such as Varani, refusing to come to close quarters with so formidable looking an object as Chlamydosaurus, when it turns upon them with gaping mouth and suddenly erected frill.

Chlamydosaurus displays, however, additional defensive tactics. When approached these lizards will often spring aggressively at the intruder, and in addition to using their not very formidable teeth, will lash sideways with their long, rough tails with such vigor as to smartly sting the hand which may fall within range of the unexpected impact.

The natural food of the frilled lizard consists almost exclusively of Coleoptera and other bark-frequenting insects, a fact which emphasizes the difficulty of keeping them long in a state of captivity. The several specimens in my possession became fairly accus-

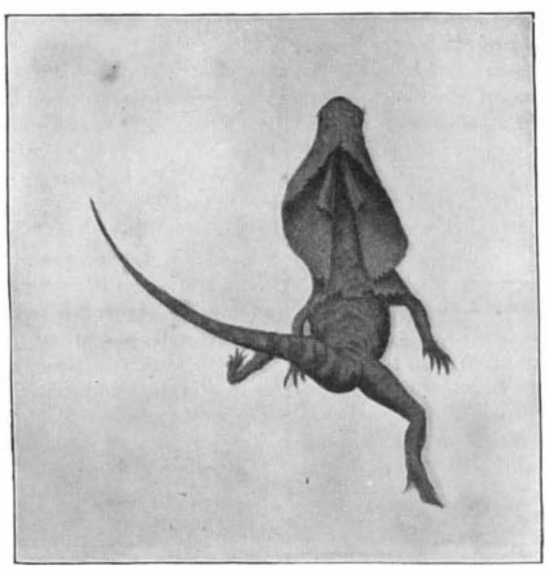


Fig. 2.—CHLAMYDOSAURUS RUNNING ERECT.
Posterior View, taken with Anschutz hand camera.

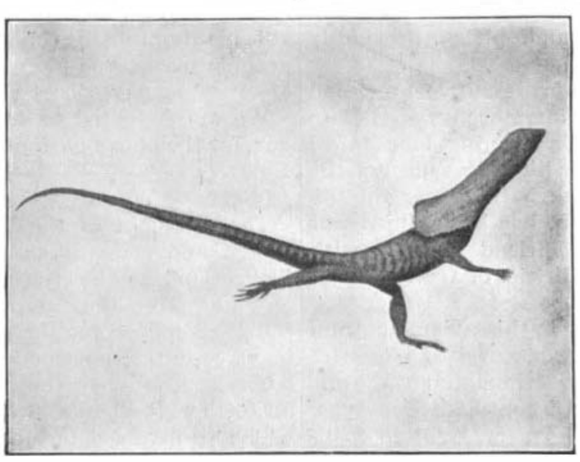


Fig. 3.—CHLAMYDOSAURUS RUNNING ERECT.
Profile View.

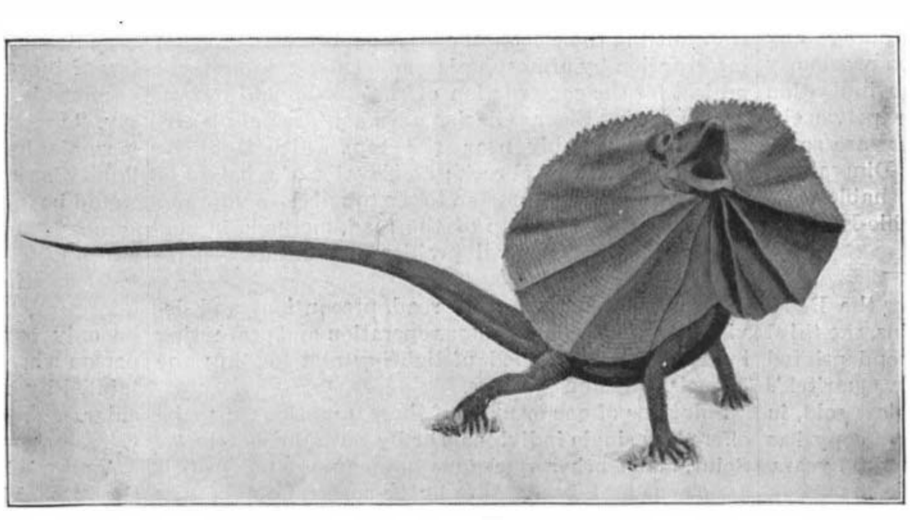


Fig. 1.—CHLAMYDOSAURUS KINGI STANDING AT BAY WITH ERECTED FRILL.