

should be spelt—which is considered to connect the typical mammoth by means of *E. trogontherii* with the broad-plated *E. meridionalis* of the Val d'Arno and Forest-bed. Two molars from Tiraspol are stated to approximate respectively to those of *E. armeniacus* and *E. antiquus*, but it is scarcely likely that three more or less closely allied forms occur in one deposit. *E. trogontherii* is recorded from Nijni-Novgorod, *E. meridionalis* from Kowialnik, and the typical *primigenius* from a prehistoric station at Kievo-Kirilovskaia. Finally, a molar from Tiraspol and a second from Bessarabia are respectively compared with those of the Siwalik *E. hysudricus* and *E. planifrons*.

The important part of Madam Pavlow's paper is, however, contained in the discussion as to the mutual relationships of the various species and races. After noting the resemblances between *hysudricus* and *meridionalis* on one hand and *antiquus* and *namadicus* (which some naturalists regard as inseparable) on the other, the author suggests that *meridionalis*, by an increase in the number and degree of compression of its molar plates, passed by means of *wüsti* and *trogontherii* into the mammoth, which died out without descendants. On the other hand, a thin-plated phase of the *meridionalis-hysudricus* group appears to have given rise to *antiquus* and *namadicus*, while the latter in turn produced the modern Indian elephant. The idea that *antiquus* was the ancestor of the living African elephant is considered improbable.

The main objection to these views appears to be the phylogenetic separation of the Indian elephant from the mammoth, the two being closely connected by the so-called *E. armeniacus*, which was probably the animal hunted by Thothmes III. in Mesopotamia. Moreover, the suggestion that *E. namadicus* (= *antiquus*) was the parent of the Indian species is unlikely on account of the peculiar form of the forehead in the extinct species. That the *meridionalis-hysudricus* line gave origin to the Indian elephant, and that the mammoth branched off from the same stock, perhaps, as Dr. Andrews has suggested, by way of *armeniacus*, is a far more probable supposition, and one that fits in with all the facts. In regard to the African elephant, there is a general tendency to connect it with *antiquus*, Dr. Andrews even going so far as to suggest ("Guide to Elephants in Brit. Mus.," p. 42) that the narrow-toothed form of the latter may have been the actual ancestor, or at all events nearly related to the ancestor, of the existing species, although in a previous passage (p. 39) he states that *antiquus* is unlikely to have given rise to descendants.

While venturing to dissent in some degree from her theoretical views, I may conclude by expressing appreciation of the value of the work of Madam Pavlow, as it is only by means of such investigations that we can hope to solve the riddle of the elephants. R. L.

WORK OF THE PHYSIKALISCH-TECHNISCHE REICHSANSTALT IN 1910.

THE subjoined notes, based upon the annual report of the above institution for last year, indicate a few of the more important researches, &c., undertaken.

One of the chief researches was the joint work carried out at the Bureau of Standards, Washington, in conjunction with representatives of the English, French, and American standardising laboratories, the most important portion of this work being the determination of the value of the E.M.F. of the Weston normal cell. This was found to be 1.0183 international volts at 20° C. within limits of 1/10,000, agreement being secured in this respect among the countries mentioned. The value given has therefore been accepted in Germany as from January 1 last.

A research on the specific heat of gases at low temperatures by the continuous-flow method has been made. In using this method, a measured quantity of energy C^2R is conducted electrically to a gas passing through a tube at a constant rate of flow. If the temperature-difference dt between inflowing and outflowing gas is known when the stationary state has been attained, as also the quantity of gas Q flowing through the calorimeter in a certain interval of time, then $\frac{1}{J} \cdot \frac{C^2R}{Qdt}$ is the specific heat of the gas pro-

vided no thermal loss takes place, J being the mechanical equivalent of heat.

In the course of the ordinary conductivity tests on copper carried out during the last few years, it has been found that with great approximation proportionality exists between temperature coefficient and electrical conductivity, i.e. that a very approximate formula was $\alpha_{15} \cdot c_{15} = \text{const.}$ (α_{15} temperature coefficient, c_{15} specific resistance in ohms m/mm^2 at 15° C.). The mean value for all types of copper tested at the Reichsanstalt since 1905, for the constant, is $6.7 \cdot 10^{-5}$. The same relation seems to hold—of course, with other values for the constants—for aluminium and iron. A similar relation has been found by Dellinger at the American Bureau of Standards.

The investigation into the variation of wire resistances with atmospheric humidity has been continued, and further experiments made on coils hermetically sealed in accordance with the suggestion of the Bureau of Standards. Two coils were filled with petroleum and two with paraffin oil, and sealed up, measurements being made before and after sealing. The coils filled with paraffin oil have shown good constancy, while the petroleum-filled ones have not been so constant.

A comparison has been carried out between the German standard petroleum testers and four English testers, the result being that the flash-point as given by the English instruments is, on the average, 2° C. lower than with the German instruments, the same oil being used for both.

Some comparative tests have been made on Seger cones in the electric and the ceramic furnace, the results showing that the cones collapse in the ceramic furnace at much lower temperatures than in the electric furnace of the Reichsanstalt. A definite opinion as to the reason for this difference is not pronounced.

Investigations have been instituted into the change in length of hardened steel. The twenty sets of end rods, of 10, 25, 50, and 100 mm. length, forming the basis of the experiments, were again measured in November, 1910. The lengths of the great majority of test-pieces have become constant, four years after manufacture; the changes observed in the remainder are within small limits (fractions of a micron). The results are to be published shortly.

A series of tests have been made on the energy-loss in dielectrics. An experimental condenser was built up of ten plates of solid insulating material interleaved with copper-foil sheets, the capacity being from 0.004 to 0.01 mfd. A description of the method of testing is given, and the results up to now show that over a range of frequency 9 to 2000 periods the phase-variation in the case of some substances is only to a slight extent dependent on the frequency, while in the case of others the variation is considerable. Sometimes it was also noticed that the phase-difference depended on the voltage applied.

Numerous other researches more or less important in character were undertaken during the year, but space will not permit of describing them here. Those interested will find the report of the Reichsanstalt published in the *Zeitschrift für Instrumentenkunde* for April, May, and June.

E. S. HODGSON.

RECENT PUBLICATIONS OF ECONOMIC ENTOMOLOGY.

INSECT pests of trees and crops demand constant attention on the part of the expert, and a very voluminous literature is growing up round the subject. Few laboratories are more prolific in published papers than those of the Bureau of Entomology of the United States Department of Agriculture. Among recent papers, we note one by F. M. Webster on the alfalfa weevil (*Phytonomus murinus*, Fab.), a pest introduced from Europe or North Africa some six years ago, and now spreading somewhat widely in Utah, and another paper by the same author on the lesser clover-leaf weevil (*P. nigrirostris*, Fab.), an insect introduced probably fifty years ago, but not very common even yet; it suffers from at least two parasites, a small Tachinida and a fungus, *Empusa sphaerosperma*. The broad-nosed grain weevil (*Caulophilus latinasus*, Say) is described by F. H. Chittenden, and also the long-headed flour beetle (*Latheticus oryzae*, Waterh.); both are found