nandez's description: "The second is called *Quauhtecallotlquapachtli* or *Coztiocotequallin* from the yellow color of the belly; it grows nearly twice the size;* in color is white, black and brown mixed, except the belly, which is pale or fulvous; it has a very long and hairy tail, with which it sometimes covers itself. It lives in holes in the ground and in enclosed hollows, in which it also rears its young. It feeds on Indian corn, which, taken from the fields, it stores up for winter. It is agile like the others, never becomes tame or lays aside its natural wildness."

The vague ideas prevailing among writers regarding the animal described by Fernandez and Erxleben is evident when it is known that at least twelve well-marked species and sub-species of American squirrels have been referred to it. These squirrels represent species having distinct ranges, lying between the Carolinas in the United States and Honduras in Central America. Since the species was named by Erxleben it has been uniformly treated by authors as a true *Sciurus*. Now let us see what foundation there is for treating this species as a true squirrel. Erxleben places it under his *Sciurus*, but, as he covers in this genus several genera now considered distinct, this furnishes no guarantee of its actual generic position. It is true that he quotes as a synonym the *Coquallin* of Buffon, but this merely shows that, in naming the animal of Fernandez, Erxleben had no very definite idea of it. Erxleben's description, evidently quoted from Fernandez, is as follows: "Magnitudine dupla S. vulgaris. Auriculæ imberbes. Corpus supra nigro, albo et fusco variegatum, ventre flavescente. Cauda supra corpus reflexa." This description might easily refer to a *Sciurus*, but when the author adds the following notes, viz., "Habitat in Mexico. Subterraneus parit, cibumque colligit pro hieme. Edit Zeam. Non mansuescit." it is evident that he is describing a *Spermophilus*.

I think it may be positively stated that no Mexican *Sciurus* has the habits of the animal described by Fernandez. The *Spermophilus macrourus* of Bennett and later authors is an abundant resident throughout the part of the tableland familiar to Fernandez. It is conspicuous about farms, and agrees in habits and colors with the animal described by Fernandez and quoted by Erxleben, and again described by Lichtenstein as *Sciurus buccatus* (Abh. k. Akad. Wiss., Berlin, pp. 115, 117 (1827), 1830). This being the case, it is difficult to see how there can be any reasonable doubt that the *Quauhtecallotlquapachtli* of Fernandez, the *Sciurus variegatus* of Erxleben, *Sciurus buccatus* of Lichtenstein and *Spermophilus macrourus* of Bennett are one and the same animal. Consequently the large, bushy-tailed *Spermophilus* of the Mexican tableland becomes *Spermophilus variegatus* (Erxleben) and stands as the type of the group to which belong *S. couchi* and *S. grammurus*, which are probably races of this species. It was probably about the border of the Valley of Mexico, near the City of Mexico, that Fernandez became familiar with this animal, and we may, therefore, consider this as the type locality.

Note: *Spermophilus mexicanus* (Lichtenstein) is the only other common and widely spread species of *Spermophilus* on the southern end of the Mexican tableland and it is readily recognizable as the *Techallotl* of Fernandez.

E. W. Nelson.

* The context shows that this must refer to the author's Techallotl, which is *Spermophilus mexicanus* (Licht.).

NOTES ON PHYSICS.

TRANSFORMER DESIGN.

A paper by F. W. Carter read before the November meeting of the American Institute of Electrical Engineers gives, for the

first time, a method for the rational design of alternating current transformers. Our knowledge of this important piece of apparatus has, up to this time, consisted in part of a precise and complete knowledge of its behavior and in part of a keen sense of propriety in design on the part of the more progressive practical electricians; but a rational method for correlating the various items in the design with a view to the production of a transformer which shall at once meet prescribed conditions in the best possible way we have not had. The method has rather been to assume (on paper) a large number of alternative designs, to calculate the action of each in detail, and to adopt that design which best meets all the requirements.

It is only fair to the practical electricians to say that Mr. Carter's results will not invalidate much, if any, of their more recent work for the reason that the old method of designing is fully adequate if enough labor is devoted to it, and this condition has been abundantly satisfied. Teachers of electrical engineering, on the other hand, may hail Mr. Carter's paper with satisfaction as affording further occasion for the application of elegant mathematics—not used in practice!

UNDERGROUND ELECTRIC CURRENTS IN NEW YORK CITY.

THERE is a serious and growing trouble with gas and water pipes, due to hurtful electrolytic action of underground electric currents, mainly from trolley lines. Mr. A. A. Kundson has recently reported to the American Institute of Electrical Engineers the results of an electrical survey of New York City and of the Brooklyn Bridge. He finds the conditions at the anchorages to be such as have been known to do serious hurt to water pipes, although, as he points out, the action upon the massive iron anchors to which the suspending cables are attached may be very slight, because of their being surrounded by concrete in which there is a certain amount of free lime and a definite lack of those chemical salts which conduce to destructive electrolytic action. The matter is, however, sufficiently serious to be taken into deliberate consideration, as it is unlikely that the anchors can withstand the present action for a long series of years.

HIGH-VOLTAGE POWER TRANSMISSION.

MR. CHAS. F. SCOTT has recently presented to the American Institute of Electrical Engineers the results of some unique tests of high voltage transmission lines. These tests have been made partly in the laboratory by Mr. Scott and partly upon the operating plant at Telluride, Colorado, by Mr. Mershon. One of the most interesting of the results is that the loss of power due to discharge between the two wires (outgoing and returning wires) begins to be excessive when the e. m. f. reaches about 50,000 to 60,000 volts. This kind of loss was one of the uncertainties which confronted the engineers who installed the now classical plant which transmitted power (at 30,000 volts) from Schaffhausen to the Electrical Exhibition at Frankfort in 1891, and these tests of Mr. Scott are the first to show just when this loss becomes considerable under practical conditions. The highest e. m. f. at present used in power transmission is 40,000 volts at the Provo plant of the Telluride Power Transmission Company in Utah, which transmits power to a distance of thirty-five miles.

W. S. F.

NOTES ON INORGANIC CHEMISTRY.

THE current number of *Nature* contains a full abstract of a paper read by Professor W. C. Roberts-Austen at the Institution of Civil Engineers on the extraction of nickel from its ores by the Mond process. This process is an entirely new departure in