

lain, then president of the Board of Trade, introduced an act to enable electric lighting companies to be formed, but, at the same time, provided that city authorities might buy up their concerns at the end of twenty-one years at the mere cost of the material; while, should they not be then pleased to use their right, it should occur again at the end of every seven years. Only recently a change was made, on the discovery that the act was a direct hindrance to speculation, for in effect it meant, "We will let you run the risk when the scheme is not paying, but will take it as soon as you have made it successful." The vicious principle is still retained, but the same has been extended from 21 to 42 years. The result I need hardly tell you. You see it in the general installation of electricity throughout the metropolis, and electric principles I hardly need describe to you. The dynamo gives a continuous low tension current, using, in its simplest form, two wires for its transmission, but the three-wire system is one of the most remarkable advances. A high-tension current traverses the mains, and is transformed to low-tension when entering the houses, the saving in copper being thereby enormous, while, by a switch arrangement, we can use the current at will for lighting or for power. But you yourselves saw the largest and most interesting example of this method of distribution when you visited the Deptford generating station of the London Company.

Electric welding is another application of primary importance, using either the two plates themselves as poles, or one plate as pole, and what we might call a "soldering bit" for the other pole. This method is extensively employed at Sheffield for repairing steel castings, and with great success. When I was apprenticed, there was used for similar purposes a metal known as "Beau Montague" (laughter), and from your faces I gather it has not been entirely forgotten. It was not a method of repairing, however, only one of deceiving. I wish I had time to tell you of present-day steel manufacture, but I will simply say that, whereas it was formerly made in pounds, it is now produced in hundreds of tons.

I am now about to extol myself. The Gifford injector caused very great interest from the first, if only because its action seemed impossible of comprehension. I was myself the first to give a complete explanation of that action without the aid of mathematics. (Hear, hear). My contention was that the whole thing might be summed up in the single word "concentration," and to show this I devised an arrangement by which a head of water left one vessel and entered another, rising almost to the same height, by simply shaping the opposite nozzles with such care as to concentrate the pressure upon the smallest possible area. A similar example is that of an armor-piercing projectile. A blunt-ended shot will be flattened still further, but a hard-pointed one will receive very little deformation in entering the plate.

To close with a few remarks on technical education. For the first eight years of its existence I was chairman of the executive committee of the City and Guilds of London Institution. I am now a vice-president, but have not time to take an active share in the management. I am glad, however, to know of the good that it is doing and of its recognition of merit in those which go up for examination. I am glad to find that, even in this very early period of the existence of your society, Mr. Walter Grant has succeeded in obtaining the bronze medal of the Institute and third position in the country for mechanical engineering, while the same student has obtained a Queen's prize in advanced machine drawing, which is granted, I am told, to only a few top men. (Loud cheers). I have some further notes placed in my hand with regard to the success of other students of Section A, from which I find that in three advanced subjects (steam, mechanics, and machine drawing) there has only been one failure in each, equivalent to 12 per cent, while the grand total of all its subjects represents a success of 82 per cent, a result of a very gratifying character, which is greatly due to the excellent instruction which Mr. Lincham has given you. (Loud and continued applause.)

A vote of thanks was next proposed by Mr. Redmayne, which was carried unanimously.

Sir Frederick briefly tendered his thanks, and the proceedings terminated.

ON THE GROWTH OF THE RATTLE OF CROTALIDÆ.

BY S. GARMAN, MUS. COMP. ZOOL., CAMBRIDGE, MASS.

SINCE the appearance of the article on "The Rattle of the Rattlesnakes" and its evolution, Bull. Mus. Comp. Zool., XIII., No. 10, Aug., 1888, the study of these crotalidæ has been continued with the purpose of securing rates of growth and other particulars not fully determined at the time of publication. As the final report may be delayed for a time it seems proper in this place to refer in advance to several items which have in some extent been questioned by other writers. The point to which attention is specially directed is the acquisition of new joints in the rattle. In regard to this, variations occur in the time; none have been noticed in the method. In all cases observed the growth of a new button, causing the appearance of a new ring or joint, was connected with the process of sloughing. Growth was first detected at the time of the advent of the whiteness in the eye and under the epiderm in general. This whiteness was evidence of dermal growth, which on the tail seemingly was prolonged a little after the eye had become clear or until the slough was cast. Possibly the apparent prolongation was due to a mere pushing back and hardening of the newly-grown button. The preparation for sloughing was in each instance preceded by the whitish appearance under the outer cuticle, as was stated in the above-mentioned bulletin. The milkiness, as it might be called, lasted longer on specimens kept in the shade than on others exposed to the sunshine.

A few extracts from notes on several individuals will, without further comment, suggest the results obtained.

The first case is that of a large banded rattlesnake, *Crotalus horridus*, on which the whiteness was visible on eye and button August 17. There was no mistaking the fact that the epiderm of the button was being pushed back to become a section of the looser portion of the rattle. By the 26th of the month the button was becoming darker, though the eye was still somewhat clouded and remained so until the 30th. At this date the eye was bright and clear and the new button had become dark colored and was seen to have pushed back the recent slough as the newest ring or joint of the series. It was not until September 4 that the slough was stripped from the body; it had previously separated from the new ring.

Another case is that of a prairie rattler, *Massasauga, Sistrurus catenatus*, on which the milky appearance was seen September 12. It was then but slight on either eye or button. Two days later it was very intense; by the 19th of the month it had become almost obsolete. Only about half of the new button was visible behind the small scales at that date. This snake sloughed on the 24th. The newly exposed button was whitish; it became dark rapidly when placed in the sunshine.

A third case to mention is that of a snake, of the same species as the latter, kept on very short allowance of food, by which no doubt sloughing was much retarded. This one did not show the milkiness until December 11. The whiteness vanished about the 23d, and the slough was put aside on the 31st. It came off nearly entire, the exception being less than half an inch, which remained attached to the anterior edge of the newest ring.

In all cases under observation a new ring has been gained with each sloughing, whether it occurred in the fall, the winter, or the spring. The snakes are still in keeping to determine the greatest number of sloughs in a season and other points. Thus far the later studies have given very little reason indeed for modifying the conclusions published in the above-mentioned article.

CURRENT NOTES ON ANTHROPOLOGY.—XXIII.

[Edited by D. G. Brinton, M.D., LL.D.]

The Language of Craniology.

"SPHENOCEPHALIC, tetragonic, dolicho-meso-brachycephalic, hypsicephalic, metrio-cephalic, hypo-stegobregmatic, hypsion-chobregmatic, cremnoopistocranic, chamelnogathic, euryzicic, chameprosopic, platyrrhine, chameconch, orthognathic, hyper-platopic"!.