the Andes; and its leaves, which are gathered and dried with great care, have been used by the natives as a stimulant and narcotic since the days of the Incas, by whom it was held in great esteem. This plant should not be confounded with the more familiar Theobroma cacao, the seeds of which afford chocolate and cacao-butter, nor with the cocoanut, whose tree supplies food, drink, light, clothing, and shelter to the natives of some tropical lands.

LETTERS TO THE EDITOR.

**** *Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The stone age in prehistoric archeology.

IN a recent number of *Science*, it is stated (p. 438), that at a meeting of the Academy of natural sciences of Philadelphia, Sept. 25, Dr. Brinton exhibited certain stone objects from Tunis, presented by the Marquis de Nadaillac. Among them was one resembling the 'stemmed scrapers' found in this country. "This form," the writer goes on to state, "is characteristic, in France, of the *later* productions of the stone age, especially of that epoch called by the French archeologists 'the epoch of Robenhausen.' Chronologically, this is regarded as the first epoch of the appearance of man on the globe, the previous implement-using animals being probably anthropoids." This is a most amazing travesty of the views of de Mortillet and the archeologists of his school. It may safely be asserted that no one holds any such opinions as these, with the possible exception of the writer of the notice in question.

At the Prehistoric congress held at Brussels in 1872, Gabriel de Mortillet first proposed his system of classification of the age of stone. In it the name 'epoch of Robenhausen' is given as synonymous with 'age of polished stone,' or 'neolithic period;' while the paleolithic age is subdivided into four grand divisions, called, in the inverse order of their antiquity, those of La Madelaine, of Solutré, of Moustier, and of St. Acheul, each characterized by its own peculiar type of instrument. This classification was still further extended by him to the age of bronze, in a table exhibited at the Geographical congress held at Paris in the summer of 1875. A full account of it was given in the *Matériaux*, vol. x. p. 372. Since then the system has been almost universally adopted by prehistoric archeologists; and it is thoroughly explained and admirably illustrated in the 'Musée préhistorique,' published by Messrs. Gabriel and Adrien de Mortillet, in 1881. In 1883 the elder de Mortillet published, in the library of contemporary sciences, his 'Le préhistorique antiquité de l'homme.' In this the views he was known to hold in regard to the so-called 'tertiary man,' or, as he more logically entitles him, 'the precursor of man,' are set forth in detail. A critical notice of this work was given by the writer in *Science* for March 30, 1883. The work is divided into three parts, — 'the tertiary man,' 'the quaternary man,' and 'the man of the present' (*homme actuel*); and the doctrine is maintained that "it is only at *the commencement of the quaternary* that man shows himself not absolutely identical with us, but so near that we cannot refuse to him, under a proper nomenclature, the name of man." De Mortillet's peculiar views, with which only a very few anthropologists sympathize, are confined to the existence of an intelligent 'implement-using anthropoid' in tertiary times. To this question he returns with renewed vigor in his journal, *L'homme*, of the 25th of last September, apropos of the excavations made at the celebrated locality of Thenay (near Tours) by a committee of the French association for the advancement of science. These were preparatory to a discussion of the question of the tertiary man at the meeting held last year at Blois.

Whether it was 'man,' or 'an intelligent anthropoid,' who fabricated stone implements in tertiary times, may well be a question; but there is no doubt whatsoever that they were men very like those first found by Europeans on this continent, and Mr. Jacob Messikommer will help any one, as he did the writer, to disinter their relics from the peat-moor of Robenhausen.

HENRY W. HAYNES.

Boston, Nov. 10.

Forgotten conclusions of science.

Your comments on the forgotten conclusion of an investigator on rectal anaesthesia reminds me of a discussion, in the section of physics at the American association, over a paper of Professor Graham Bell's, on a possible method of communication between ships at sea. Several eminent men and some distinguished foreign visitors took part in the discussion. It led out into suggestions of telegraphing across the ocean without wires, and experiments of communication across rivers, and across the strait between Southampton and the Isle of Wight.

As my recollection serves me, Professor Morse went over all these experiments more than thirty years ago, and supposed at one time he could carry his telegraph across rivers and streams by means of two wires, one running up and the other down stream along the shores, and then dipping into the water. I remember seeing a cut illustrating it. Professor Bell's paper was a new adaptation of the old idea; but the discussion, and all, seemed to me to be wholly oblivious of the experiments and conclusions of Professor Morse.

P. J. FARNSWORTH.

Clinton, Io., Nov. 8.

The lamprey as a builder.

During the month of June I had an excellent opportunity to observe the manner in which the lamprey eel (Petromyzon marinus) builds a stone dam for the deposit of spawn and for the protection of the progeny.

The location of the structure was in the Saco River, within the ripples near the foot of the lower falls, three miles from the sea, and near the level of mean high water. It was nearly at right angles with a shore-wall of granite, and was about fifteen feet long and from one to three feet in height. Its position and triangular shape in vertical section were well adapted for securing a change of water, and a hiding-place among the stones for the young.

When I first noticed the movements of the eels, they were diligently at work, their system of operation being very methodical; but I was not able to determine whether there was any action by single pairs, as

their movements were rapid, and the number engaged at one time must have been fifty, while it is probable that a hundred were at work, for they were constantly coming from various directions to take or resume their places on the up-stream side of the dam.

The river-bed at this point was made up of water-worn stones, chips of granite, and fragments of bricks, over which there was a steady flow of water, the depth being four or five feet, but varying with the level of the tide.

The mode of raising the material was the same in all cases: the eel attached his mouth to a stone, and then, with many wrigglings and contortions (the head always pointing up-stream), lifted it from the bottom; he then backed down stream, floating with the current, until the stone was over the centre of the heap, when it was dropped, lodging sometimes on one side, and sometimes on the other. He then usually returned for more material to the deep and comparatively still pool formed above the dam by the previous excavations, but in some instances was unable to stem the more rapid current at the top of the dam, and was carried below it. When this happened, he swam around the outer end of the dam, and returned to the pool to resume the work.

I noticed in many instances that the heavier stones were lifted by two eels, working alongside of each other, and carried to their proper places in the structure. Half-bricks, weighing two pounds, were thus transported by one individual, and many of the stones were of much greater weight.

Later in the season many of the eels were lying quietly upon the up-stream side of the dam, and about the middle of July all had disappeared.

The temperature of the water, when the river-current was not met by the tide, was in June about 64° F., and in July 71°.

Stones of various sizes, lying at the base of the shore-wall, were removed; and it was evident that the stability of this wall would have been impaired if it had been built upon a rubble or gravel foundation instead of upon a solid ledge.

JOHN M. BATCHELDER.

Cambridge.

A viviparous pumpkin.

To-day, on cutting open a common pumpkin fresh from the field and perfectly sound, it was discovered that very many of the seeds had already germinated. The caulicles were from one to three inches in length, while some of the rootlets were over seven inches. The cotyledons, wherever free from the seed-covering, were green in color, and spread so as to expose the growing plumule. In one case the second leaves were partly unfolded. E. T. NELSON.

Delaware, O., Nov. 1.

American pearls.

In answer to George F. Kunz in No. 89, let me say that many pearls, ranging from five to twenty-five or more dollars in value, have been found in the fresh-water mussel in the Little Miami River, a few miles from here. The prevailing color is pink, in various shades. In size they vary, the larger ones being about as large as a pea, or larger. The pearls have been found at various times, from a dozen years ago, up to last April. They are commonly found in the Unio, — U. undulatus, or U. occidens. R. N. ROARK.

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FERDINAND VON HOCHSTETTER.

FERDINAND VON HOCHSTETTER was born at Esslingen (Wurtemberg), April 30, 1829, and died, after a painful illness of five years, at Vienna, on the 17th of last July. His father, a clergyman, was a well-known botanist, and a professor of natural history. While a pupil of the celebrated geologist and paleontologist, Prof. F. A. Quensted of Tübingen, Hochstteter was a classmate of the late A. Oppel, and is one of the most prominent of the geologists of the school to which science is indebted for such celebrated geologists and paleontologists as Oscar Fraas of Stuttgart; C. Rominger of Ann Arbor, Mich.; A. Oppel, and Trautschold, of Moscow. When an assistant in the Austrian geological survey, he was appointed naturalist of the 'Novara expedition round the world,' 1857–59. After visiting Gibraltar, Rio de Janeiro, the Cape of Good Hope, St. Paul Island, the Nicobar Islands, and Java, Hochstetter left the Novara, shortly after its arrival at New Zealand, and passed almost the whole of 1859 in preparing a careful geological reconnoissance of the northern and southern islands of New Zealand. Scarcely had the Novara anchored at Auckland, before Julius von Haast, an Austrian nobleman of great ability, well known afterward as the director of the Canterbury museum of Christchurch, came on board. Haast had come out a short time before as a settler. Hochstetter at once secured him as his assistant; and after seven months in the northern island, and two months in the province of Nelson in the southern island, with the aid of the New-Zealand government and of the leading citizens of the colony, he succeeded in determining most satisfactorily the geology of this distant country, describing not only the beautiful volcanic formation, but also the secondary, the tertiary, and the quaternary formations, and adding much to our knowledge of geographical geology. The results of Hochstetter's researches were first given as lectures before the Auckland mechanics' institute, June, 1859, and at Nelson in October of the same year. The