Natural science has of late discovered a law of the greatest fundamental importance, the law of preservation and correlation of forces. This law shows that force can neither be created nor destroyed, it can only be transferred, and manifest itself under other phenomena. Light can be converted into electricity, and the nervous current is very much akin to the electric current. It moves the magnetic needle, and has many properties in common with the electric currents. They are, however, not identical, since the velocity of the nervous current, as Helmholtz was the first to show, is only 61 mt. in a second, while that of the electric current is not far from 300,000 miles in the same time.

Thus far we are able to accompany the light wave: it has united with the nervous fluid, and will thereby be transmitted to the central organ of the nervous system, the brain, where it is ultimately converted into thought.

But here, science in its present state, stands on the confines of an apparently unfathomable mystery, to penetrate which another mirror must be invented. I have, however, faith in the power of science, and am convinced that nothing is impenetrable to the eye of the human mind.

The history of civilization shows a slow work, and frequent disturbances by political convulsions. Europe, especially Germany, where scientific investigation is so generally appreciated and liberally encouraged, may be crushed with the downfall of the untenable forms of personal government; but this country, although still betraying many deficiencies of youth, is the bright star that will usher in an epoch of higher culture.

In regard to the last problem of our subject, the formation of thought out of visual impressions, centuries may pass, before a brain mirror will be invented. But so sure as science is ever progressive, so sure it is that another Helmholtz will will come to invent this mirror, and as the course of civilization and human progress is westward, let us hope that he will be—an American.

MAMMALIAN FOSSILS.---A FACETIOUS REVIEWER.

Mr. J. P. Lesley contributes to *Old and New*, a review of the recent work of Dr. Leidy on "Mammalian Fossils of North America," which is worth reading for its humor as well as the scientific information it contains. It is so seldom that scientific discourse is relieved by wit, that it is refreshing to meet occasionally with an essay which happily blends learning with fun.

Mr. Lesley says:

The long expected and truly magnificent work of Dr. Leidy, on the mammalian remains in the rocks of Nebraska and Dakotah, with a synopsis of all the mammalian fossils as yet discovered in North America, has at length appeared. It forms an entire volume of the quarto "Journal of the Academy of Natural Sciences" of Philadelphia, and is illustrated with plates excellently well done. These plates show the teeth, jaws, heads, and limb-bones of the American fossil mammals, either life size, or on a reduced scale. Dr. Hayden prefixes to the book a geological description of that remarkable part of the United States, where the greatest treasures of this sort have been preserved for our astonishment and study. Creatures lived there, strange enough to test the credulity of the most superstitious—hogs that chewed the cud, deer that had solid hoofs like horses, or horses with cloven hoofs like deer; tropical pachyderms feeding at the swampy margins of vast fresh-water lakes, from the shores of which arose ranges of the Rocky Mountains in 45° north latitude.

North America in pre-human times was provided with every kind of mammal excepting man—horse, deer, cow, sheep, elephant, rhinoceros; and the smaller kinds were not forgotten—except the hippopotamus. That would have been a little too absurd. The red Indian and the mastodon together?—that is all right. But the corn-planter and the river-horse of the Nile and Niger!—not if you please.

Such at least were our reflections, until a Friday night, a few weeks since, we were destined to hear Professor Cope inform the members of the American Philosophical Society, that he had just discovered an unmistakable hippopotamus' molar tooth in a bed of Miocene Tertiary marl in New Jersey, and that a learned friend of his had collected other teeth, from a similar position in the series of rocks in Maryland, which he identified generically with hippopotamus. But the two species were different: that of the New Jersey locality having been no larger than the common hog, and distinguished by certain tuberculous processes studding the crown of the tooth, from which feature Mr. Cope should construct its specific name.

We ask, what does all this raree show of Palæontology mean? Who gets up those strange and varied forms? Was there no trick of humor in these shapes? Are we to call them tentative inventions, of a busy, ever busy mind, never satisfied with the result, but ever changing the combination, ever reaching toward a higher pitch of success? Or do we see a slow eternal growth—form expanding into form—form budding out of form—as in some vast circumplanetal coral reef, filled by one family of life, fed by one gulf stream of vital force, energetic, but half conscious, and as improphetic for itself of its own culmination in man, as the British savage was of the appearance of his children, the Newton and the Faraday?

The books say that no mammal has ever been found in rocks older than the Tertiary. Some years ago—a good many years ago, in fact, for it was in those early days of the Philadelphia Academy, made brilliant with the presence of Wilson, and Nuttall, and Say, and McClure, and Bartram, and Ord, and the Abbé Da Serra, and the wild Rafinesque, and the enthusiastic Vanuxem—Dr. Bartram found in the cretaceous green sand marl of New Jersey, a vertebra, which he so labeled (libeled is the proper word here), and placed it in the Academy's museum. Some time afterward, Dr. Leidy pronouncing it the vertebra of some extinct whale, and the European palæontologists being startled at the thought of a cretaceous whale, Sir Charles Lyell wrote over to Mr. Conrad, to look up the spot and verify the rock. He did. The marl was not cretaceous—but Middle Tertiary. Europe fell back in its easy-chair and lit another cigar, with "Infernal American pretension," *sotto voce*.

But the cigar was hardly lighted, when it was flung again into the grate. Dr. Emmons had found a mammal in the—Europe sprang to its feet with a thundering "What?"—in the Trias of North Carolina. This was rather too bad. In the Old World—that land of precedent and vested privileges—they could find no precedent for suckling babies which went back or down, lower than the Tertiary. The American cretaceous pretense had been squelched. No one thought of the Oolite. It was folly to suggest Lias. Madness alone could dream of babies at the breast in the age of the Muschelkalk, Keuper, or Rodte-todt-liegende. Their very names were against it. One might as well go recklessly two steps deeper—Permian—Carboniferous, and dig extinct sucking-pigs out with anthracite coal.

But how vain are the assaults of prejudice against the gates of Truth! A fact envelops us like a nightmare—or the cool night air—however we may rage or rhyme. Emmons found two perfect little one-side jaw-bones, about an inch and a quarter long, and so smooth and perfect that a lens could detect no fracture anywhere, and he found them in that iron-ore bed which lies between the two layers or benches of the Deep River coal-bed, at Egypt, in North Carolina. This stratum of iron ore is only two feet thick; and each layer of coal, above it and below it, is about two feet thick. But the ore contains millions of teeth of reptiles and fishes belonging to extinct genera and types of Triassic age.

Dr. Leidy examined both the specimens found by Dr. Emmons, and received one as a gift for the Academy's museum. They were alike. They belonged to a little mammal no bigger than a field-mouse, but with elongated jaws; for it fed on the numerous insects of that period! Dr. Leidy has now explained to the Academy the most remarkable deduction to be drawn from these little waifs of a by-gone world. Until their discovery it was taken for granted that all jaws of mammals were provided with knuckles, knobs, or condyles, at the upper hinder end, articulating into a socket in some form of temporal bone, attached to the other bones of the skull. All other known mammal jaw-bones were single bones, armed with a condyle. Shall we say that this poor little old-fashioned Triassic mouse's jaw-bone wasn't worth a condyle? Or, more probably that condyles hadn't been invented then? Its little jaw ends, backward, in a broad, smooth, nearly straight edge, chisel-shaped. How it was attached thus to its poor little head, or whether it had an auxiliary bone with a condyle on that, to articulate into the head, are questions, like many others, waiting fortunate discoveries to be answered. Reptile jaws, instead of being simple, are made up of several pieces; first, the long bone for the insertion of the teeth, a splint bone laid along its base inside, a triangular bone at its back end, a large bone on top of that, and an articulating bone (in lieu of a condyle) capping that again. We see in our poor little mouse, a praiseworthy attempt to free itself from this horrid reptilian style of getting up (resembling the feminine coiffure of the day), without attaining to the dignity of wearing a condyle.

Probably the mouse was in the intellectual posture of that member of the London Royal Society, who, in 1776, when Paine patented the crank for the steam-engine, wrote a memoir to show that the crank was inapplicable to the steam-engine; and another and more distinguished British engineer followed his brother member's assertions, with a conclusive mathematical demonstration, to the same effect. It is soothing to believe that in Triassic, Liassic, and perhaps through Cretaceous ages, the dislocation of the jaw was a casualty unknown to mammals. All jaws as yet were many-hinged, ligamentous, and capaciously flexible. The bird-like kangaroos of the Connecticut River Valley—the enormous Hadrosaurs of New Jersey—could worry down gentry of half their own size. They had the cheek to do it.

[For the Scientific American.]

THE COCOA PALM.

BY J. CANTINI.

A brief sketch of one of the principal palm trees may be of interest to many of our readers, especially at this particular season of the year, when the leaves form such an important article of commerce, and an object of general adoration in the Christian world. In some places, especially in Catholic countries, the palm leaves are largely imported from the southern coast, and an extensive business is carried on, though only for a short time.

The inhabitant of the North, who has never visited the tropical countries, has but a faint idea of the actual beauty and grandeur of these plants, which, even in the South, amidst eternal verdure, are ever an object of admiration. From our earliest childhood we hear the word "palm" in connection with every thing that is beautiful and poetical. We speak of the "palmy days," when we think of times of happiness; and we say, "he has carried off the palm," when we allude to glory. It would be difficult to say how long the palm has been associated with religion and sentiment, as the word "palm" itself is an expression of comparatively modern times. The Romans called a tree which grows on the shores of the Mediterranean the "Fan Palm," probably on account of the resemblance of its leaves to the palm of the human hand (*palma*).

One of the loftiest of the palms is the cocoanut tree (*Cocos nucifera*), which grows to a hight of from sixty to a hundred feet. According to some naturalists, it is a littoral plant, but Humboldt and Bonpland assert that they met with it inland (in Mexico), though of a growth somewhat inferior to those of the sea shore. The tree prefers a sandy, arid soil, and it is rare that much vegitation is found growing around it. The cocoa-palms adorn the otherwise desolate beach or the low islands. Gliding along the shore in a boat, the attention of the traveler is aroused by the doleful, wailing sound which the wind causes in waving to and fro the long leaves. There is something solemn and almost ghost-like in the appearance of an avenue of cocoanut trees, when seen by the peculiar moonlight of the tropics, especially when there is a strong breeze blowing. The leaf-crowned summit forms, everywhere, an object of truly intertropical scenery, and the palms well deserve the name given to them by Linnæus, "Kings of Vegetation."

Various, nay, "hundredfold," as the natives express themselves, are the uses of this plant, and its propagation may be considered as a never-failing source of progressive national prosperity, for it will furnish, with but little trouble, clothing, food, and habitation.

Almost every particle of this tropical production can be used. The trunk serves to build the huts; the rind or husk, which is fibrous, is used, everywhere, for matting, brushes, etc. The leaves, which measure some twenty feet in length, are, also, of great utility. The finest roofs are made of the plaited cocoanut leaves. Screens, baskets, hats, and many other domestic articles are made of them. The heart or young leaves, called "cabbage," is an excellent vegetable, which can be prepared in many different ways. The dried leaves are sometimes used as torches in dark nights, while the washer-women often burn the foliage for the sake of its alkaline ashes. In the East Indies, the leaves of the cocoa palm, like those of the Palmyra, serve the natives in lieu of paper, upon which they write with a stylus. It is not unusual that letters, written upon these leaves, neatly rolled up, and sealed with a little gum lac, pass through a postoffice.

The most important part of the tree is the nut, which grows in bunches of twelve or more in number. In some parts, the fruit can be gathered four and five times a year. The liquid or water, or, as it is generally and improperly termed, the "milk," is, in the young nuts, a most delicious draft, as it is always cool, more particularly early in the morning. It is slightly effervescent, and, if mixed with Madeira wine or brandy, it makes an excellent beverage, though many consider it unhealthy. The natives ascribe many inestimable properties to this liquid; amongst others, they pretend that, if used as a wash, "it clears the face of wrinkles and imparts to it the rosy tints of youth."

The milk is made of the kernel itself by grating it and pouring warm water over it, after which it is pressed, yielding a whitish liquid. This milk is almost indispensable in the tropics, and fully takes the place of animal milk. Bread and pastry, prepared with it, are most delicious, and retain an almost imperceptible taste of cocoanut. The albumen of the young nut is quite soft, and can be removed with a spoon, and might appropriately be termed "a vegetable blanc mange."

Another valuable and important article of commerce, obtained from this nut, is the oil. The natives all understand how to extract it from the kernel by a most simple process. They remove the kernel from the shell and boil it in water, after which they pound it in a mortar and then press it. The milk or liquid is then put over a slow fire. The oil or fat will soon float on the top and can easily be skimmed off. Two quarts of oil are usually obtained from fourteen fresh nuts. This oil, when fresh, is excellent for cooking purposes, and for frying fish and plantains; but, not being rectified, it soon turns rancid, thus giving a most disagreeable taste to the food prepared with it. The natives everywhere lavish it upon their persons, as a preventive against the sting of insects, or to give to their skin a glossy appearance. In cool weather, or even over night, it becomes quite hard, and requires melting before it can be used for burning. Cocoanut oil is, with the exception of the Cohune oil, the only article in use among the Indians of America to burn in lamps and torches.

The much-relished "toddy" is also obtained from the cocoa palm by tapping the trunk. This beverage is slightly stimulating, and, when fermentation has set in, it is intoxicating. During the state of fermentation, this liquid can be used as yeast, and the bread made with it is remarkably light and spongy.

These are the general uses which are made of this valuable plant; but the inhabitant of the tropics will discover many more, which are, however, of value only to those who live there and are able to make use of the numerous medicinal and other properties attributed to this tree.

HOW TO CLEAN PAINT.— There is a very simple method to clean paint that has become dirty, and, if our housewives should adopt it, it would save them a great deal of trouble Provide a plate with some of the best whiting to be had, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which wash the part well with clean water, rubbing it dry with a soft chamois. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than using soap, and does not require more than half the time and labor.