

NATURAL HISTORY NOTES.

American Palms.—It is only when the literature of the order is brought together, says a writer in *Science*, that we appreciate the extent and varieties of palms. In the new *Genera Plantarum* of Bentham and Hooker there are 132 genera of true palms characterized, and about 1,100 species indicated. The following palms are indigenous to this country: Without counting one or two tropical species, which grow in Southern Florida, and which are outlying Cuban and Bahaman species, we have two true palmettoes—*Sabal palmetto* and *S. Adansoni*; the Blue palmetto, *Rhapidophyllum hystrix*; the Saw palmetto, *Serenoa serrulata*; just beyond our national borders, on the islands off Lower California, a palm of a peculiar genus called *Erythea edulis*; and finally, in Southern California, the elegant *Washingtonia filifera*, named in honor of our first President.

Scales, Feathers, and Hairs.

The idea current among naturalists generally, and largely taught to students, that scales, feathers, and hairs are identical in nature, is combated by Mr. J. E. Jeffries in a recent issue of the *Proceedings* of the Boston Society of Natural History. Mr. Jeffries considers the epiderm to be the primitive, if not the true skin, as it is formed long before the corium, which is a late and very variable product of the mesoblast; and because all the organs of sense are formed from it. The epiderm may be considered as primitively consisting of a smooth mucous layer, an epitrichial one, and perhaps an intermediate one of parenchymatous cells. In birds and mammals the outer layer is lost, and never renewed, while the middle layer becomes thickened and subject to various modifications, such as drying, conversion into horn, etc. Scales are moulted and renewed, scuta are not. The toe pads of birds may be seen to pass over into scuta on the sides of the toes of many birds. Scuta bear feathers as epidermal appendages, scales never do, thus pointing to scuta, which have a mucous layer and outer horn coat, with a mesodermal core, as simple folds of the skin, not as appendages.

The early stages of a feather and of a hair differ. The latter is formed in a solid ingrowth of the epiderm, and the latter from the epiderm of a large papilla. A hair does not contain any of the mucous cells, while a considerable portion of a feather consists of them. The supposed homology between feathers and scales seems to fail before the facts that the mucous layer is absent in the latter, and that Studer has shown that the imagined scale-like nature of the remiges of the penguins is a fallacy.

Mr. Jeffries avows his belief in the distinct origin of the dermal appendages of the higher vertebrates, and asserts that the nakedness of the Amphibia is a strong argument against the identity of any of the alvian appendages with those of reptiles or mammals.—(*American Naturalist*.)

The Coloring Matter of Flowers.—The petals of flowers are far oftener colored by a pigment soluble in the cell sap than by one in a solid, granular form. Of 200 species examined by Mr. P. Fritsch, who has recently investigated the subject, only 30 contained solid pigments in the cells either of the petals or of the fruits.

Far the most common of these solid pigments is yellow, much the greater number of yellow flowers, including nearly all the yellow composite, being indebted for their color to substances of this nature.

Exceptional instances of soluble yellow pigments occur in the petals of *Dahlia*, *Althaea* (marshmallow), and *Tagetes* (marigold), and in the hairs of many species. Solid yellow pigments are described in *Impatiens longicornu*, where they vary greatly in size and form, in the Indian cress (*Tropaeolum*), in the evening primrose, pot marigold (*Calendula*), pansy, cone flower (*Rudbeckia*), digitalis, etc. The particles of pigment are often seen in a state of active molecular motion; they are always colored green by iodine, and are soluble in concentrated sulphuric acid, with a deep blue color.

The pigment appears to be always embedded in a matrix of protoplasm. A solid red pigment was observed in the fruits of the dog rose, mountain ash, lily-of-the-valley, white bryony, spindle tree, climbing bittersweet (*Celastrus*), and yew. The red pigment in the cortical portion of the root of the carrot is of a very peculiar kind, resembling long, pointed crystals.

Insoluble violet pigments are rare, but occur in *Thunbergia alata* and the larkspur; while blue granules are found in the fruit of *Viburnum tinus*. Brown insoluble pigments were found only in the seaweeds *Fucus* and *Furcellaria*.

The development of the colored granules does not end with their acting as pigments; for after this period they go

from only 846 for the previous year, and the gain was held and continued. So, in 1866, the new issues were 8,874, but the following year the number bounded to 12,801. Very oddly, it never afterward varied two thousand, up or down, during fourteen years, the new issues for 1880 being 12,926. But the next year the number suddenly started forward to 15,548, and there have since been steady and great gains. If the reissues and the designs of last year should be added to the new patents, the aggregate would be 22,383.

THE TIGER BY INSTANTANEOUS PHOTOGRAPHY.

The portrait of the tiger which we herewith reproduce from *La Nature* was obtained by the same process as the one of the lion that we gave last year, that is to say, an instantaneous photograph was reproduced directly upon wood, and then accurately engraved by the artist. The photograph was taken by a skillful English operator, Mr. Henry Dixon.

Compressed Air Delivered in Pipes.

The machinery and plant of the Birmingham Compressed Air Power Company, which is shortly to be laid down upon a site already selected, will cost, with the necessary buildings and service construction, some £140,500. It will be capable of delivering 5,000 indicated horse power in compressed air. At the outset there will be put down four air compressing engines driven by compound condensing steam engines, and heated by six sets of elephant boilers, four in each set. Now, in the three wards forming the experimental area, we find from the latest total returns that scarcely 3,000 indicated horse power can be needed for engines up to 30 horse power; it may fairly be assumed that for no engines above that power is the new motor likely to supplant steam, since the pressure obtained by the user even after reheating will not exceed 40 pounds to the square inch. The whole of the surplus 2,000 indicated horse power is scarcely likely to be used up by tradesmen other than those engaged upon industrial processes, by builders and contractors for working winches and cranes, and by tramcar companies. In any case the user will have to look to the ice difficulty by having the service pipe passed through the nearest flue, or making special arrangements.

The air will be supplied at a pressure of four atmospheres, and heating to at least 321° Fah. will be necessary to obtain the best results. However, should the estimates of the engineers be anything like correct, the scheme should be a success. They see their way, it is said, to furnish the compressed air at forty dollars per annum per indicated horse power. An addition of 20 per cent—assuming say \$50 for small steam power—is suggested. This movement, contemporaneously with the

starting of refrigerating plant in the same town, is of much industrial significance for Birmingham, and of interest to all engineering centers.

Dr. Adolph von Bruening.

The German color industry has met with a serious loss by the death of Dr. Adolph von Bruening, who died suddenly in his forty-seventh year of age, on the morning of April 21 last, at Frankfort-on-the-Main. He was one of the founders of the colossal color works, known to the industry as the "Farbwerke, formerly Meister, Lucius & Bruening," at Hoechst-on-the-Main, which owe their flourishing condition in a great measure to his proficiency and inventiveness as a practical chemist. The excellent organization of institutions for the laborers connected with the color works are the manifestations of his philanthropic care for his subordinates. He was born at Ronsdorf, near Elberfeld, in 1837, and only a year ago he was raised to nobility, by the Emperor Wilhelm, in acknowledgment of his patriotism and distinguished merits in industry. He was also a member of the German Reichstag, representing from 1874 to 1881 the district of Homburg-Usirgan.



THE TIGER BY INSTANTANEOUS PHOTOGRAPHY.

through a variety of changes of development or degradation.

Points about Patents.

The belief of some persons that sugar in paying quantities can be got from corn stalks as well as from sorghum, recalls the fact that the State of Connecticut gave to Edward Hinman a patent for making molasses from corn stalks in October, 1717, or nearly 167 years ago. Senator Platt, who introduced this statement in a recent speech, cited some other curious old Connecticut patents, showing that the spirit of invention was rife there at an early date. There were no devices in the list for manufacturing wooden nutmegs, but in 1783 a patent was given to Benjamin Hanks for "a clock which will wind itself up."

Another interesting point that may be derived from Mr. Platt's tables is that, while in 1790 there were but three patents issued by the United States Government, in 1792 but eleven, and in 1795 but twelve, the issue for year before last was 18,135, and for last year it was 21,196. At certain epochs there have been remarkable jumps in the annual list. Thus, in 1854, the number of new patents rose to 1,759,