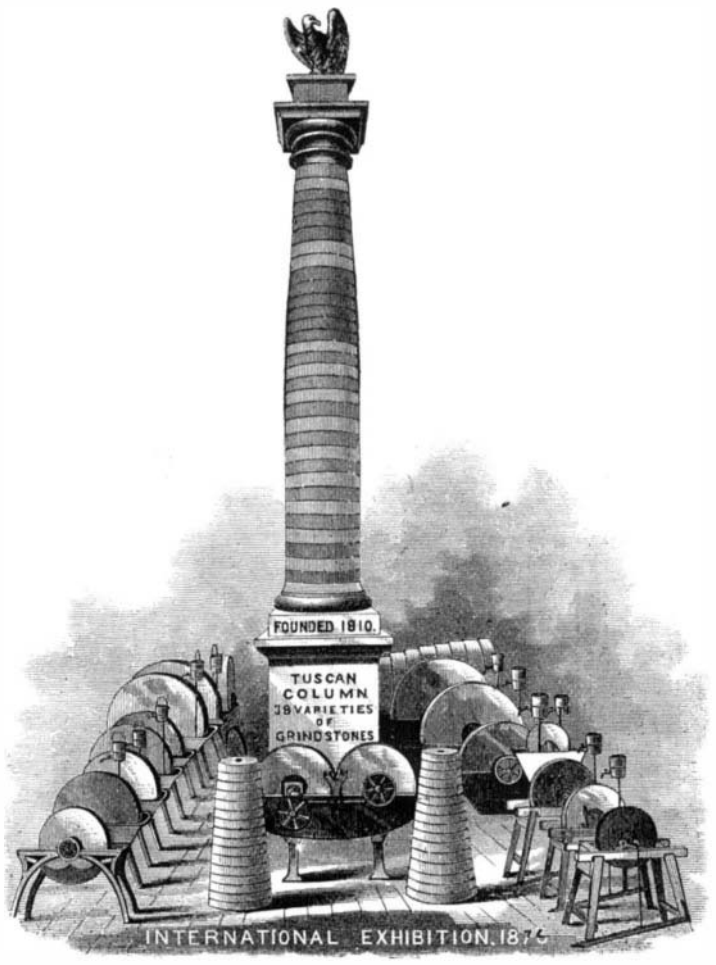
THE GRINDSTONE COLUMN AT THE CENTENNIAL.

It would hardly be imagined that such homely objects as grindstones could be grouped tastefully and even elegantly, and yet an enterprising manufacturer of these useful articles (Mr. J. E. Mitchell, 310 York avenue, Philadelphia) exhibits his productions at the Centennial Exposition in so artistic a manner as to challenge universal admiration. From the center of his allotted space, which is located on the southern main passage in Machinery Hall and near the Corliss engine, rises a superb Tuscan column, twenty-six feet high. This is composed of thirty-six grindstones of different grits and qualities, piled one above the other. Slight variations in diameter of the stones produce the graceful swelling outline of the pillar; and their different colors, ranging from red to bluish, gray, and yellow, are harmoniously combined to produce the effect of tinted bands. The general appearance of the column is shown in the annexed engraving, and it forms one of the most prominent objects in the vast display.

Mr. Mitchell's exhibit is not merely artistically attractive, but is also one of those sensibly arranged contributions from which any one, studying them, can obtain, by simple inspection, a fund of useful knowledge. For instance, there is a collection of mounted grindstones from which the machinist may learn all the different modes of adjusting the stone, and make valuable comparisons. He may also see all the various kinds of stones, and thus note the differences in grit, and determine which is best for his own especial purpose. There are huge stones weighing from 1,000 to 4,000 lbs. each, such as are used for grinding saws, files, edgetools, and cutlery, for beadstones in nail works, and for finishing the iron work of locomotives. Thence downward, every size of stone may be examined, to the smallest made.

Three medals have been awarded to Mr. Mitchell for this exhibit. A very interesting pamphlet, on the subject of grindstones, their history, and how to hang and use them, may be had free by addressing the manufacturer above named.



MITCHELL'S GRINDSTONE EXHIBIT.

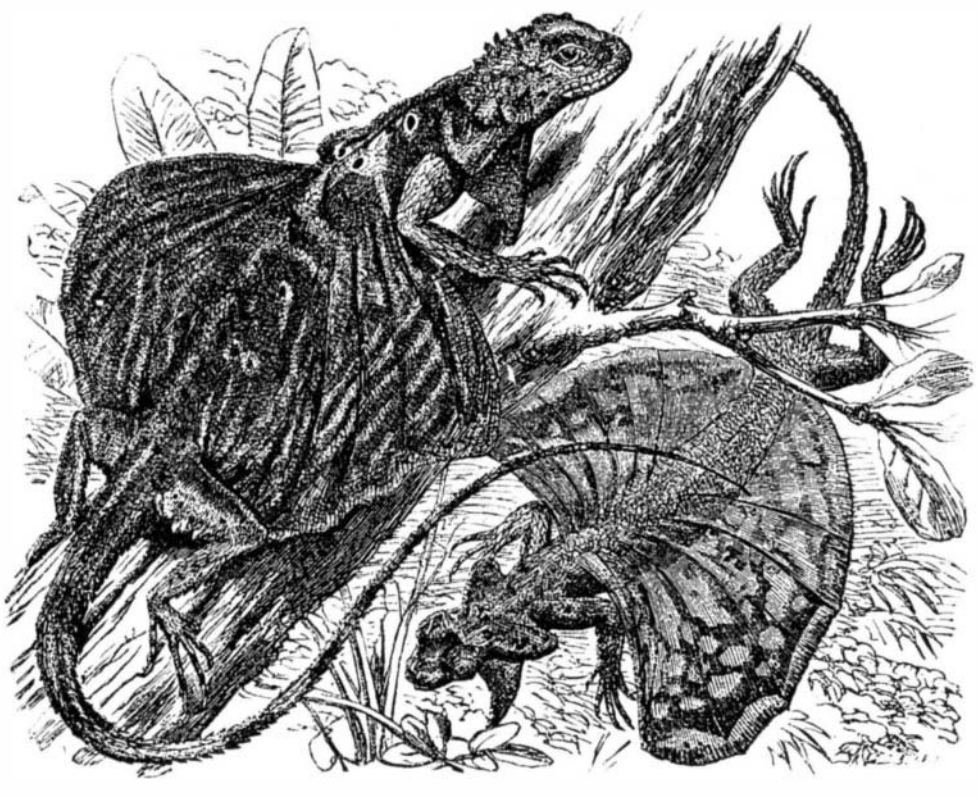
The Physical Properties of Gallium.

M. Lecoq de Boisbaudran, in a recent note to the French Academy of Sciences, states that he has prepared about 7½ grains of gallium. In liquid state, the metal is a beautiful silvery white; but in crystallizing it turns blue, and its brilliancy becomes greatly diminished. The point of fusion is fixed, for the metal melts very slowly at 86.27° Fah., and crystallizes very slowly at 86·09°. The density of the specimen is 5 935. Gallium crystallized under water crepitates sometimes on heating.

FLYING LIZARDS.

The remarkable lizards of our Western hemisphere, properly termed the iguanas, have their counterparts in the agama family of the East. The tribe contains between thirty andforty genera, and many of them are peculiar and interesting. Our engraving represents, first, the fringed dragon (*draco fimbriatus*), which is commonly found in Sumatra. The head is grayish white, covered with an irregular network of dark brown, and on the throat are a number of circular specks covered with granular scales. Upon the under parts of the male, the scales are rather large and keeled: and upon the wings are a number of rather short, white dashes of a partly triangular shape. Along the sides run series of small triangular keeled scales.

The other specimen shown in our illustration is also a so-called flying lizard, called the flying dragon (*draco volans*. It is a native of Borneo, Java, the Philippines, and the neighboring islands. The prominent characteristic of this reptile is the singular developed membranous lobe to be found on each side, which lobes are strengthened by certain slender processes from the six false ribs, and serve to support the animal during its bold leaps from branch to branch. The flying dragon is the most agile and daring of the winged lizards; and it can leap a distance of 30 paces, its so-called flight being similar to that of a flying squirrel or flying fish. The color of this reptile is variable, but is usually as follows: The upper surface is gray, with a tinge of olive, and daubed or mottled with brown. Several stripes of grayish white are sometimes seen on the wings, which are also ornamented with an angular network of dark blackish brown. When the dragon is at rest or even traversing the branches of trees, the parachutes lie in folds along the sides; but when it prepares to leap from one bough to another, it launches into the air and sails easily, with a slight fluttering of the wings. It makes itself more buoyant by inflating the three membranous sacks that depend from the throat. It has been commonly supposed that these animals gave rise to the fabled dragons of the ancient mythologies; but the probability is that the real clue to the origin of the monster is to be found in the gigantic saurians of ancient times, which were found on earth for some time after man made his appearance on the planet. We select the engraving from Wood's "Illustrated Natural History."



FRINGED DRAGON AND FLYING DRAGON.

Fall of a Meteorite in Kansas City.

Mr. J. D. Parker, in a letter to the *American Journal of Science*, says: "On June 25, 1876, between the hours of nine and ten in the morning, a small meteorite fell upon the tin roof of Mr. Isaac Whittaker's business house, No. 556 Main street, Kansas City, Mo. The meteorite came down with sufficient force to cut a hole in the tin roof on the front part of the house near an open window; but not passing entirely through the tin, it bounded back a few feet and lay on the roof. Mrs. Baker, who occupies rooms in the front part of the house in the second story, and Mrs. Whittaker were standing near the window when the meteorite fell, and heard the sharp concussion when it struck the roof. Mrs. Baker immediately picked up the meteorite as it lay near her on the roof, but dropped it again, finding it too hot to retain in her hand.

"The meteorite is a plano-convex specimen, about 1¾ inches in diameter, and about ⅛ of an inch in thickness. The outside or convex surface possesses the usual crusted appearance, while the inside or plane surface differs from ordinary meteorites in possessing the appearance of sulphuret of iron, subjected to some degree of heat, instead of nickeliferous iron. One might easily infer that the meteorite was scaled off from a large bolide that passed over the city at that time. As it fell in the city, I have named it the Kansas City meteorite. It has not been subjected to chemical analysis."

Growth of the Earth.

"Since meteoric matter is continually falling upon the earth, she must of course be growing larger, and the daily number of meteors is so immense that it would be natural to suppose that the increase might be quite appreciable in a few centuries. It is not so, however: the surface of the earth is so enormous, compared with the quantity of meteoric matter, that, even on the most favorable hypotheses, her diameter would grow only about an inch in five hundred million years by accessions of this kind. A few figures will make this clear.

"As to the number of visible meteors, there is substantial agreement among authorities. The estimate of Professor Newton is as large as that of any one, I believe, and he puts it at 7,500,000 *per diem*, which number we will use. As to their average weight there is more difference of opinion. Probably, however, the most careful and best founded investigation is that of Professor Harkness, published in his report upon observations of the November meteors of 1866; and his conclusion is that 'the mass of ordinary shooting stars does not differ greatly from one grain.' Professor Newcomb appears also to concur in this estimate. There are reasons, which it would take too long to discuss, for thinking that this value is likely to be somewhat too small; but on the other hand it is almost absolutely certain that the average mass cannot be as great as one fourth of an ounce. To be on the safe side, we will assume 100 grains as the mean weight of the visible shooting stars.

"Remembering that the pound is 7,000 grains, we shall then find nearly 107,000 pounds, or about 50 tuns, for the total weight of one day's supply of shooting stars. An allowance must also be made for the meteors too small to be visible (which are known by telescopic observations to be very numerous), and for the matter brought down by aerolites. If we double the quantity stated above we shall certainly be abundantly liberal, and this will give us 214,000 lbs. a day, or about 78,164,000 lbs. per year, as the earth's rate of grow h in weight.

"Her increase of bulk depends upon the density of the meteoric matter, and probably this density does not differ much from that of ordinary soil, or nearly three times that of water. If so, each cubic foot would weigh about 187½ lbs., and the annual meteoric accession to the bulk of the earth would be not far from 417,000 cubic feet. A cube about 75 feet on each side would be a little larger. It would take more than four millions such to make a pile as large as Mount Washington. Now, since the surface of the earth is about 5,484 millions of millions of square feet, it follows that the annual supply of meteoric matter, if spread uniformly, would form a layer whose thickness would be only $\frac{1}{131,500,000}$ a foot, or very nearly $\frac{1}{11,000,000}$ of an inch. In other words, even on such extravagantly favorable hypotheses as we have assumed, the formation of a sheet of meteoric matter covering the earth to a depth of 1 inch would require a period of eleven hundred millions of years.

"If we suppose meteoric matter to have been just as abundant in space as now, since the beginning of time, and that the velocity of the earth's orbital motion has remained unchanged, and that the effects of her atmosphere and of her gradual shrinkage under the action of gravity can be neglected, then it can be shown by an easy course of reasoning, which would, however, hardly suit these columns, that her diameter must have grown during her whole existence at the same uniform rate as now, and we find that to build her up to her present dimensions by such a process of aggregation must have taken a period of at least twenty-seven and a half millions of millions of years.

"It is not intended to assert, however, that the earth was really formed in this way; and even if it was, the above estimate is of little value except as indicating the order of magnitude involved; since there is no certainty whatever—not even a probability—that in the early stages of the formation of the planetary system circumstances nearly enough resembled the present to warrant any conclusion. Nor must it be forgotten that the more probable estimates of Harkness and others as to the weight of meteors would lengthen all the periods of time mentioned from ten to one hundred fold. We have given the smallest values possible."—*Professor C. A. Young, in Boston Journal of Chemistry.*

A Severe Hurricane.

A cyclone of remarkable severity passed over the Central American states during October. The town of Managua, in Nicaragua, was inundated; four hundred houses were blown down, and damaged to the amount of $2,000,000. In Blewfield, on the Mosquito coast, three hundred houses were destroyed, and the coffee crops over an immense district were utterly ruined. Twenty lives were lost, and several vessels on Lake Nicaragua were sunk by the disaster. The total damage is estimated at an amount of over five million dollars.