the way and overcomes all our mechanical difficulties; in fact, he furnishes us with the honey, while we are the drones in the hive that derive benefit from his labors. Give credit; then, where credit is due. The inventor is the world's benefactor, and as such we take off our hat to him.—*Mining and Scientific Press.*

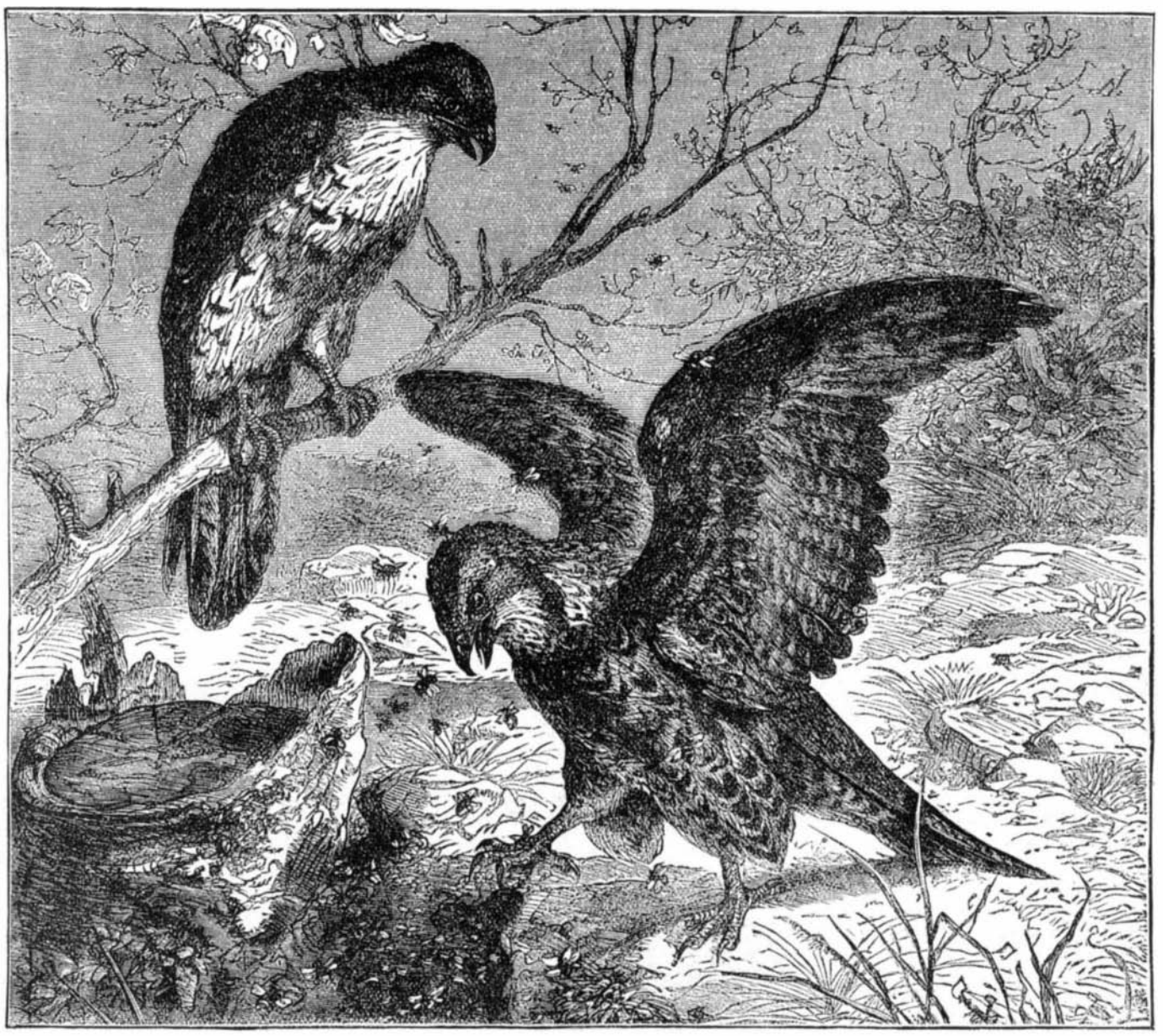
Oil of Orris Root.

Orris root owes its use during more than two thousand years chiefly to its fragrance, which, curiously enough, does not belong to the living root. Its slight and by no means aromatic smell is first developed into the agreeable perfume after drying, without doubt in consequence of changes of a chemical nature, concerning which at present our knowledge is deficient. When the dried root stock is submitted to distillation with water, eventually there appears upon the water a crystalline odorous matter, which is justly prized in perfumery and is specially prepared by some of the larger distillers. But the yield is very small, only about 1 part per 1000 of the orris root used. The product is of a yellowish brown color, of the consistence of a firm ointment, and possesses the characteristic odor of orris root.

THE HONEY BUZZARD.

The honey buzzard is one of the *falconidæ* or hawks, and is known to natural historians both as *falco pernis* (*Cuvier*) and *falco apivorus* (Linnæus). It is known throughout Europe; and specimens with a wing measurement of 50 inches are on record, but commonly 20 or 23 inches is the extreme width from tip to tip. The head is always gray, and the eyes, as well as the feet, are yellow. The talons, bill, and cere are black. The plumage on the upper portion of the body is brown; beneath, brown and white mingle indiscriminately, while the tail, which is long, is marked with transverse ash-colored bars; the toes are only half feathered. In the female the plumage is similar in color, only very decisively spotted.

The honey buzzard breeds in trees; the eggs are two in number, color gray, with obscure spots. An egg collector came across a nest of one of these birds while in pursuit of his hobby at Selborne, England. In the nest he found but one egg, which was much smaller than that of the *falco apivorus*, not so round, and dotted at each end with small red spots, being surrounded in the center with a broad blood-marked zone.



HONEY BUZZARDS AND THEIR PREY.

It must not be supposed that the food of these birds is restricted to honey, which only forms its dessert; but they devote attention to small birds, insects, and reptiles, as well as "rats and mice, and such small deer," and have been known, says a writer in the *Young Fancier's Guide*, from the pages of which we select the engraving, to purloin the eggs of other birds.

A Curiosity in the Baltimore Record Office.

In the course of the examination of titles in the record office to the ground comprised in Federal Hill Park, which will involve a good deal of labor yet before completion, Mr. Warfield T. Browning (assisting the city examiner, Mr. Henisler) yesterday came upon a deed which excited remark among the persons in the office for some curious matters referred to in it. The paper is a deed of trust in the nature of a will from Dr. John James Giraud, who resided on South street, and owned a part of the Federal Hill ground, conveying all his property to John S. Tyson in trust for the wife, heirs, and legatees, of Dr. Giraud. The deed was executed March 16, 1826, but Dr. Giraud did not die until 1837. Among the legatees was Right Rev. Ambrose Marechal, Archbishop of Baltimore, for several thousand dollars, and the trustees of the poor of the city and county. Among the bequests are two patents, dated January and April, 1821, to Dr. Giraud for "a discovery in mechanism, consisting of a very simple machine of considerable power, for the use of steamboats and other machinery requiring the application of great power. The patent is termed the handle or cylindrical machine, and the machine carries in itself its fulcrum or point of support." He also bequeaths his right in a discovery of a specific or medicine for the prevention or cure of yellow fever, plague, and malignant and pestilential fevers. The deed says its eminent virtues have been proved by three years of operation and trial by order of the government and medical faculty of Havana. Dr. Giraud's memoir on this subject was published in 1825 by William Wooddy, Baltimore. The specific consists of two liquors, limpid, tasteless, and inodorous; they are neither purgative nor emetic, but recall the secretions through the proper emunctories, and the crisis takes place by perspiration, etc.

The composition of the liquors, he says, cannot be discovered by chemical analysis, and their discovery was the result of the study and labors of one third of his lifetime. The government at Havana was to have given him, the deed states, $120,000 for the discovery; but the commotions in Spain and the death of Governor General Mahy interrupted the negotiations. He says he desires the secret to be sold by the trustees for his heirs to some government, and for that purpose, for the first time, writes down the composition of the recipe. Should any other person, as is not impossible in this age of science and chicanery, be found possessed of the recipe he is to be treated as a fraud, and the trustee is authorized "to prosecute him with all the rigor of the law." The doctor estimated the amount to be realized from the sale of his patents at $60,000, and directs that out of that sum $6,000 shall go to the archbishop and $3,000 to the poor. His sanguine dreams of profit from this source were not realized, however, no government being found to purchase the patent for the specific; and now the missing ingredient is the money that was expected.—*Baltimore Sun.*

The Care of Machinery no Mystery.

The *Mill Stone*, a monthly journal published at Indianopolis, Ind., one of the many good papers printed in the interest of special trades at the West, gives to its readers the following sound advice on the watchful care necessary in operating machinery:

To correctly plan and devise improvements in machinery involves the exercise of a considerable degree of original genius; and to fully develop such improvements, and to bring them into the most practical shape, requires, in addition to this, the application of acquired knowledge of the construction of the machine or mechanical combination, in such manner that each of the different parts thereof may be properly proportioned and arranged with reference to the particular function which it is designed to fulfil. When this is done, and the work completed, its useful mission has commenced, and inventive talent or skillful instructors need not be employed upon it, unless it should be to modify or add further improvements. Yet, however complete in itself, or however effectually it may perform its work, it is not endowed with the faculty of self-preservation, and, unless it be properly cared for, will be subject to numberless accidents and injuries, involving not only its own immediate or ultimate destruction, but, in many instances, the loss of life or limb to those employed in its operation. This necessary care requires, not the expert mechanic or professional skill, but simply the exercise of common sense. It is by prompt attention to little things that the maximum efficiency and durability is attained, with properly designed and constructed machinery. When the bearings of shafts and the spindles are not oiled sufficiently, not only does the increased friction require a greater amount of driving power, but the bearings are roughened or destroyed in a proportionate degree. When the caps of journal boxes are left too loose, the journal wabbles, and, if there is gearing attached to the shaft, its teeth are badly worn out of shape; while, if the caps are screwed down too tight, the oil is forced out, the journal heats, and both the shaft and bearing are soon rendered worthless. These matters are of no small moment, and the aggregate loss resulting from inattention to them is very great. It is not confined alone to the machinery of mills and other manufacturing operations, but occurs in a very much greater degree in machinery employed in agriculture. Many a thrasher, horse power, or harvester has been branded of bad construction, and been prematurely disabled, when a few drops of oil, or one or two turns of the wrench, were all that were required to set things to rights. Many other items might be mentioned, in which attention to little details, requiring only an application of ordinary common sense, will guard against great and unnecessary waste of power and damage to machinery; but these are sufficient to illustrate the almost self-evident proposition that, while talent is required to originate, and practical knowledge to construct machinery, its most efficient operation, and the profit in its use resulting therefrom, can only be secured by bringing to bear upon its management the plain, ordinary principles derived from every day observation and experience.

Etching on Glass.

M. E. Seigwart has lately given some interesting particulars about etching upon glass.

Since fluoric preparations have been produced at reasonable prices, the decoration of glass by their means has steadily made its way. Etched glass is now to be found everywhere, and glass etching runs glass cutting very hard. It is very easy to understand that well etched objects appear actually more beautiful than those which have been cut. The cost of production is cheaper; and since M. Hock, a Viennese chemist, has given us an elaborate work upon the technics of glass etching, the difficulties attending this kind of work have been reduced to a minimum.

As is well known, fluoric acid usually etches smooth, while other fluoric preparations yield a matt surface. The most beautiful ornamentation is obtained when certain parts of the glass surface are rendered matt by means of fluoride of ammonium which has been slightly acidified by means of acetic acid. The matt appearance is not always the same with different kinds of glass, but varies much in beauty;

this effect is governed by the composition of the glass, lead glasses being easily acted upon, and furnishing a very fine matt surface.

Where it is desired to have the surface of the glass not altogether matt, but shining like ice, as in the case of window glass, this may be attained in a simple manner by placing the glass plate in a perfectly horizontal position and covering it with fine groats. Then very dilute fluoric acid is poured upon it. The groats act as a shield, and produce upon the glass raised points.

Several ways exist of etching photographs on glass. A good result may be secured by covering the surface with a solution of gum made sensitive with bichromate of potash, and printing the same under a negative; after the image has been thus produced, it is dusted over with minium or red lead, and the red picture thus obtained is fixed and burnt in in the usual manner. The easily soluble red glass, so obtained, is treated with strong sulphuric acid, when a white matt design is produced, and the picture appears by transmitted light as a positive.—*Photographisches Archiv.*

Power of Wooden Vessels to Withstand Pressure.

We have lately received a communication from a correspondent at Dayton, O., referring to an unfortunate occurrence, which caused the instant death of one man, and the narrow escape of several others. It seems that a number of men, in the employ of a manufacturer of artificial mineral waters, were in the act of charging a quantity of water, contained in a large iron-bound oaken cask, with carbonic acid gas, at a pressure of 130 lbs. to the inch. The cask, without any previous warning, exploded, with the results above stated. The explosion was sufficiently severe to splinter the cask and the three-inch planking over head. That such accidents are not of more frequent occurrence is to be wondered at; and under such circumstances we cannot but consider the employment of such vessels criminal. We have often cautioned persons against employing wooden casks for this and similar purposes; as it is evident from their construction that, under such conditions of pressure, the whole strain must come upon the hoops and binding clamps, which, unless of extreme strength, could not be expected to withstand such strain as they were placed under in the above instance. Besides, such vessels are always of doubtful efficacy for such purposes, for, where they hold liquids under pressure, even provided it were possible to render every joint tight, the liquid would gradually ooze through the pores of the wood; and if it so happened, as in the instance above cited, that the liquids contained a free acid, the metal bindings would speedily become corroded and weakened, thus rendering rupture, in time, certain.

Should personal and public safety be sacrificed to the mere question of economy? And is the incurring of such risks justifiable by the small advantages derived therefrom? Before more of such deplorable accidents as the one here recorded have occurred, it is to be hoped that the proper authorities will take the matter in hand, and prevent further loss of life from such criminal practices.

The World's Age.

Mr. William Chambers, the veteran author and publisher of *Chambers Journal*, contributes to that excellent periodical a summary of some of the many views held by scientists as to the antiquity of our world. The *Quarterly Review* treated the same subject recently, and that most conservative of magazines now admits that the ordinary interpretation of the date of the creation, about 6,000 years ago, is to be set aside as untenable and at variance not only with historic and archæological research, but with the substantial discoveries of geology. The reviewer quotes the opinion that it is impossible that the earth can have existed many millions of years, as the earth is cooling, if not rapidly, at such a rate as to make such an antiquity impossible; and again, there is reason to believe that the earth's rotation is not so rapid as formerly.

The question as to the date of creation must be considered to refer to our solar system alone. The nearest fixed star or sun outside our system—possiby the center of a similar system—is too far off to enter into the question of the age of our sun and its planets and their satellites, being two hundred millions of millions miles away. Sir Charles Lyell gives the date of the Cambrian formation of rocks as at least two hundred and forty millions years ago; while Mr. Darwin assigns to the world a much greater age even than this. Mr. Adams has essayed to calculate the retardation of the earth by the friction of the tidal waves on the atmosphere; and in conjunction with Professor Tait and Sir William Thomson, he allows 22 seconds per century as the time lost by the slackened speed. Mr. Chambers wisely concludes his article as follows: "We can only say that the theories propounded are eminently suggestive, but nothing more. It is not remarkable that there should be differences of opinion among men of science concerning the dark and stupendous questions of the cosmogony of the world. All we deprecate, in the present state of human knowledge, is rash dogmatising, one way or another."

The Poughkeepsie Bridge.

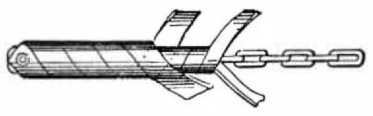
Progress is being made in the construction of the bridge across the Hudson river at Poughkeepsie, a work, which, when completed, will increase the facilities of travel between Pennsylvania and New England. The coal traffic alone, it is anticipated, will bring in a large revenue to the bridge, as the freight to Massachusetts and other manufacturing States will be considerably reduced.

The American Bridge Company is to construct the bridge and its approaches, and the materials for the first caisson are now being delivered. There will be four piers in the river, built on caissons, the foundation of which will be 85 feet below the surface of the water. The piers will be 525 feet apart, and will be built up of masonry to 130 feet above high water mark. The bridge is to have a double railroad track, a wagon roadway, and a way for foot passengers. It is stated that the Erie railway can cross the Hudson by this bridge and enter New York city, making a *détour* of only 10 miles from its present route, which has the disadvantage of landing its passengers in Jersey City.

CHAIN GEAR AND FASTENINGS.

Our extracts this week from Knight's "New Mechanical Dictionary"* include a series of engravings relating to chain, together with others showing forms of fastening rope, etc. These will doubtless prove useful to builders, quarrymen, farmers, and others who frequently have occasion to use tackles, for hoisting heavy weights and for many other purposes.

Fig.



Chain-Belt.

Fig. 1 shows how a chain, by wrapping it with strips of canvas or leather, may be made into a round belt, whereby power may be transmitted. Fig. 2 is a chain hook which simply clamps one link between two adjacent ones. Fig. 3 shows how chains are fastened by ropes, when, as in the case of a vessel's cable, they are to be subjected to heavy strains. The upper figure is termed a double and the lower a single chain fastening. These hitches are very strong and not liable to slip. Fig. 4 is a chain pulley having pockets or depressions in its periphery, in which lie the links or alternate links of a chain which passes over and

Fig. 2.

Chain-Hook.

Fig. 3.

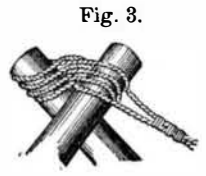
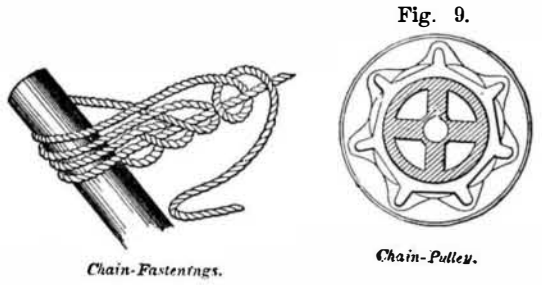


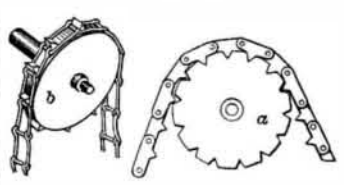
Fig. 9.



Chain-Fastenings. *Chain-Pulley.*

gives motion to or transmits from the pulley. In the chain wheel, Fig. 5, the sprockets of the wheel are adapted to receive the links of the chain successively. The power may be communicated by the wheel to the chain, or conversely. The former is shown in the familiar chain pump, and the latter in machines where the operation is inverted, the column of water pressing upon the buttons attached to the chain and causing them to descend in the tubes, thus rotating the wheels.

Fig. 5.



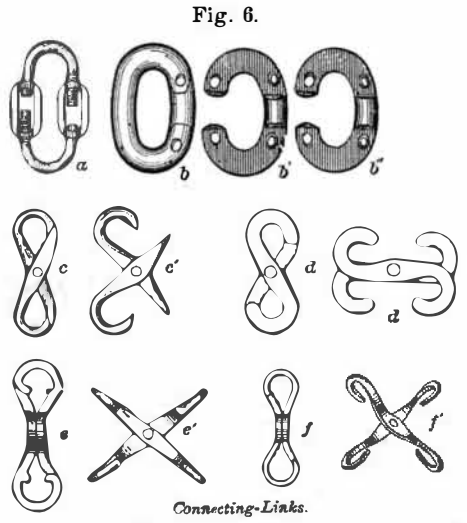
Chain-Wheel.

Fig. 6 represents several forms of

LINKS

capable of being taken apart and thus becoming a means of uniting the broken ends of a chain. Each half of the link, *a*, has a swivel to which it is connected by a head, the swivel of each part forming a nut for the threaded leg of

Fig. 6.



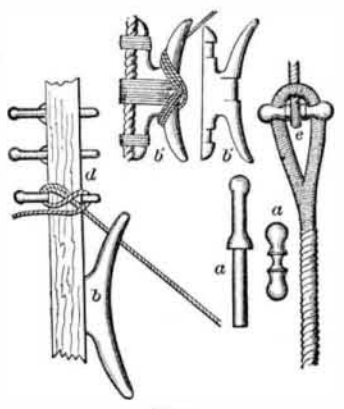
Connecting-Links.

the other portion. The link, *b*, is made of two sections, *b'* *b''*, laid upon each other and riveted. The other figures represent various forms, in which the twin swiveling portions form a mousing for each other.

CLEATS.

These are belaying pieces, consisting generally of a bar with two arms fastened to a postor stanchion by a bolt passing through its stem. Those shown at *a*, Fig. 7, are simple belaying pins. *d* is a rope belayed. *b* is a common cleat, lashed in place as shown at *b'*. *e* is a belaying pin or toggle, spliced into the end of a rope to secure an eye upon. Forms of

Fig. 8.

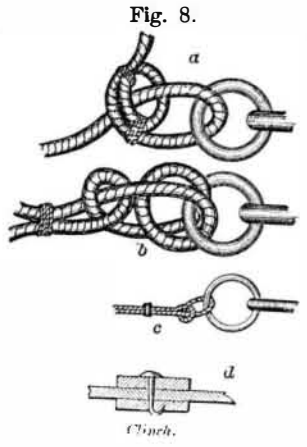


Cleats.

CLINCHES

are shown in Fig. 8. In nautical parlance a clinch is a mode of fastening large ropes to rings, such as anchors, etc. It consists of a half hitch with the end stopped back to its own part by seizings. *a* is a slip clinch; *b* a clinch secured, and *c* a simple clinch. In carpentry a clinch is a fastening, as at *d*, in which the long end of a nail is turned over, and the recurved end caused to enter the material so as to oppose retraction.

Fig. 8.

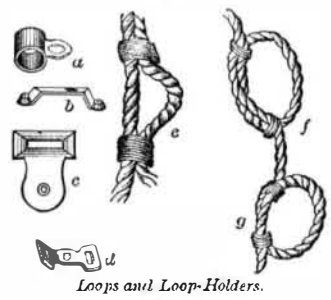


Clinch.

LOOPS

of different kinds are illustrated in Fig. 9. *a* is the simple sleeve or collar; *b*, *c*, and *d* are modifications of the same. *e* is nautically termed a bastard loop. It is stopped in place with

Fig. 9



Loops and Loop-Holders.

rope yarns. *f* is a loop used as a fair leader for ropes, etc *g* is a bend stopped with seizings.

Gold in America---Its First Discovery by the Pre-Historic Indians.

In a recent speech delivered in the House of Representatives, R. B. Vance, member of Congress from North Carolina, said that the first discovery of gold in the United States was made in Mecklenburg, in that State, in 1820. A correspondent of a North Carolina newspaper corrects this statement, saying that the first gold was found in Cabarrus in 1799, and refers to Wheeler's "History of North Carolina" for evidence.

Old chroniclers give an account of a province called Cofachiqui, which was visited by De Soto's gold-hunting expedition in 1538-40, and which was embraced in what afterward became the States of Florida, Georgia, Alabama, and Mississippi, and, according to Logan, in his history of "Upper Carolina," had its center on the western limits of South Carolina. Its capital and chief town stood upon the tongue of land between the Broad River of Georgia and the Savannah, just opposite the modern district of Abbeville. The Spaniards entered this capital after a two months' march, and found the country ruled by a beautiful Indian queen, Adalla, who entertained the Spanish governor and army with much ceremony. Here they found hatchets formed from an alloy of gold and copper. By this their cupidity was greatly excited, and they concluded that they had found a country abounding in the long coveted precious deposits of gold. And so indeed they had, says Logan (whom we quote freely), but it was neither their good fortune nor their desert to find out the precise spot where gold could be obtained. In less than fifteen miles southeast of the town, on the opposite or Carolina side of the river, lay one of the most extraordinary gold deposits in the world. The Cherokees were well acquainted with the Dorn mine. This is shown by the numerous relics of their handiwork scattered around it, and there can be little doubt that the massive nuggets of its outcropping gold supplied them abundantly with the finer metal of the alloy that so attracted the eyes of the Spaniards. It is no less known, to a few who have inquired into the traditions of the aborigines, that the gold and copper, found in their possession, in the form of solid masses or curious trinkets, by the first white men who visited the country, were obtained from these sources.

The Indian method of smelting these metals was one of the most remarkable devices of savage ingenuity; in practical efficiency the famous blowpipe of Dr. Hare was scarcely superior. Logan tells us that, having first hollowed out

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