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(Illustrated articles are marked with an asterisk.)

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No. 1016.

For the Week Ending June 22, 1895.

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FIRST VOYAGE OF THE ST. LOUIS.

The American Line steamer St. Louis completed her maiden voyage at 4:45 A. M., Thursday, June 13. The actual time from Sandy Hook to the Needles, a cluster of three pointed rocks in the English Channel, west of the Isle of Wight, was 7 days, 3 hours and 53 minutes. The vessel was delayed five hours by fog. The engines are capable of making 95 revolutions a minute, and for a time, on the trial trip, their speed was increased to 98 revolutions, but on the voyage the engines made only 76 to 84 revolutions per minute. One peculiarity about the new engines is the smoothness with which they run, as, according to the reports of the passengers, at no time or in any part of the ship was the vibration sufficient to enable any one to count the revolutions of either of the screws. During the first few days some difficulty was experienced with the ventilating apparatus, but this was overcome. The daily runs of the St. Louis were 314, 443, 431, 441, 433, 432, 416, and 249 knots, the average speed being 18·38 knots. For a first voyage, this is considered highly satisfactory. The arrival of the St. Louis at Southampton gave occasion for public rejoicing. The event is to be further celebrated by special festivities.

THE CHUPADEROS METEORITE.

The great Chupaderos meteorite, which was discovered broken in two immense pieces in 1581, may now be seen at the portal of the National School of Mines, in the city of Mexico. One piece has been placed at each side of the courtyard entrance. The huge, irregular masses have the appearance of brown hematite iron ore, but at points where they have been chipped or filed the common meteoric striations are plainly recognizable. The smaller piece is 7 feet long, 3 feet 7 inches wide, and 1 foot 8 inches thick, and weighs 20,450 pounds. The larger is 8 feet 2 inches long, 6 feet 7 inches wide, and 1 foot 4 inches thick, and weighs no less than 34,400 pounds. The dimensions given are, of course, averages, as the specimens are exceedingly uneven and are full of trilobite depressions or "pot holes."

The form of the two pieces leaves no room for doubt that they were originally parts of one great meteorite weighing more than 27 tons. The density has been calculated at 7·8.

The two sections were found 800 feet apart, at a point 900 miles from the city of Mexico. More than four centuries later, in 1893, they were carried to that city and placed in their present position.

THE SCIENTIFIC AMERICAN AS AN ADVERTISING MEDIUM.

Referring to our advertising columns, we call attention to the announcement of Mr. Layman, inventor of the Outing Boat, and to a cablegram order for boats therein presented, from the Grand Duke Alexander of Russia. His Highness, it appears, is a reader of the SCIENTIFIC AMERICAN; hence his order to the American boat maker.

There is no doubt the SCIENTIFIC AMERICAN is the most carefully read and most widely distributed paper of its class in the world. It reaches every nook and corner of the globe. The array of manufacturing industries, of which announcements are presented in every number, proves how very valuable the paper is as an advertising medium. Mr. Layman states that the SCIENTIFIC AMERICAN brought him over two thousand correspondents, and he adds the paper "has been a wonderful help to me in building up my business." We have no doubt hundreds of other advertisers could testify to similar benefits received.

FORCE EXERTED BY THE HUMAN JAWS.

Dr. G. V. Black, a dentist of Jacksonville, Florida, has made some interesting experiments upon the force exerted by the human jaws in the ordinary mastication of food, and also the greatest force which the jaws are capable of exerting.

By means of a spring instrument provided with a registering device he took records of about 150 "bites" of different persons. Of these, fifty have been preserved as characteristic of the ordinary man, woman and child. The smallest pressure recorded was 30 pounds, by a little girl seven years old. This was with the incisors. Using her molars, the same child exerted a force of 65 pounds. The highest record was made by a physician of thirty-five. The instrument used only registered 270 pounds, and he simply closed it together without apparent effort. There was no method of determining how far above 270 pounds he could have gone. This test was made with the molars. Several persons exceeded a force of 100 pounds with the incisors and 200 with the molars. The physical condition of the persons experimented upon seemed to have little bearing upon the result. Dr. Black is of the opinion that the condition of the peridental membranes is the controlling factor, rather than muscular strength.

Dr. Black found that, in the habitual chewing of food, much more force is exerted than is necessary. In chewing a piece of beef steak, the crushing point of which was from 40 to 45 pounds, from 60 to 80 pounds stress was actually employed at each thrust of the teeth. The principal articles of food tested had crushing points as follows: Steak, 40 to 45 pounds; mutton chops, 35 to 40 pounds; broiled ham, 45 to 60 pounds; roast beef, 45 to 60 pounds; pork chops, 20 to 25 pounds, and the choicest parts of cold boiled beef tongue, 3 to 5 pounds. The tougher parts of beef and mutton required a crushing force of 90 pounds in some instances.

IRON WORKING AMONG PRIMITIVE PEOPLES.

Dr. Ludwig Beck, of Germany, in his recent work on the history of iron, gives some interesting information in regard to the furnaces, tools, and implements used by the savage races of Africa and Asia. The iron ore used by the African smith is usually hematite, which is found in great abundance. His furnace is of clay with four draught openings at the bottom through which air pipes are inserted. The furnace is about four feet high and will produce a lump of excellent iron in forty hours.

The Bango and Bataka tribes handle the white hot metal with tongs made of green wood held together by an iron ring. Their anvil is a square stone with a top as flat as possible, and another stone does service as a hammer. With the Kaffirs the process is even less complicated than this. The iron is not formed in a lump, but the drops of molten metal are allowed to cool, and are afterward picked out of the slag separately. The larger ones are hammered out flat between two stones, and a little heap is built up with the flat pieces outside and the small pellets packed between them. This is then given a welding heat and forged.

The Zulus make excellent assegais, beautifully polished with bark and ground to the keenest of edges upon a coarse stone. The African smiths have no vises, but hold the implements they are making between their feet, leaving both hands free to use such tools as they possess.

The natives of Borneo and Sumatra have brought the art of iron and steel making to a high degree of perfection. The furnace commonly used in Borneo is of yellow clay, strengthened with rings of bamboo. It is about 3 feet high and 10 feet in outside diameter. The walls are 2 feet thick. The blast apparatus consists of an upright wooden cylinder open at the top and closed at the bottom, where a valve connects it with bamboo pipes leading to the furnace.

The cylinder is fitted with a plunger, which is moved downward by hand and upward by a spring pole to which it is fastened.

The iron ore is roasted about twelve hours in a wood fire and then broken into small pieces and mixed with ten times its volume of charcoal for smelting. When a lump of iron is finally produced it is taken out of the furnace with wooden tongs and hammered with wooden mallets. It is then cut into small pieces and hammered again until the slag is driven out, and a very good grade of soft steel remains. The waste is said to be one-third.

THE COMMERCIAL VALUE OF MONAZITE.

It begins to look as though the great value of monazite mining lands had been very much overestimated. There is, of course, a demand for rare earth oxides for the manufacture of incandescent gas lamps, etc., but the supply of monazite is, unfortunately for the speculator, practically unlimited, and its price has dropped correspondingly.

Monazite (from *μονάζειν*, to be solitary) was so called in allusion to its supposed rarity. For a long time subsequent to its discovery in Norway it was believed to exist nowhere else. It was afterward found, however, in Silesia, Bohemia, Belgium, England, Brazil and the United States. The deposits in this country are near Norwich, Conn., and in North Carolina. Monazite is in substance a phosphate of cerium, lanthanum and didymium, containing silicon and thorium in variable proportions, probably as impurities. The oxides of the rare earth metals, cerium, thorium, yttrium, erbium, lanthanum and zirconium possess the peculiar property of becoming incandescent at a moderate heat. The light emitted is the greatest in the case of thorium, and this oxide of this metal is obtained principally from monazite. It is used extensively in the Welsbach lamp, where a network mantle of the oxide is suspended over a Bunsen burner and produces an intense white light.

When monazite was discovered in North Carolina, great excitement prevailed for a time. Fabulous stories of the value of the resinous-looking substance were circulated and sand from the river bottoms was carefully washed over in cradles like those used by the gold prospectors of California. Some of the pioneers made a good deal of money at first, but, as the washing process is exceedingly laborious and slow when conducted by hand, and many tons of sand must be washed to extract one of monazite, nobody got rich. Nevertheless the people all believed firmly that immense fortunes could be made with proper apparatus for mining, and chemists and engineers in the Northern cities were overwhelmed with letters and circulars