PRINCESS TOPAZE.

We publish herewith an engraving (for which we are indebted to our worthy contemporary the Illustrirte Zeitung) of Princess Topaze, a tiny dwarf, who was born of normal parents in the year 1879, in the neighborhood of Paris. We are told that the great capital in which she was brought up left its mark. She charms those who go to see her, not only by her attractive appearance—for although so small, she is perfectly formed—but also by her vivacity and intelligence. She has some skill as a prestidigitator and mind reader, to which accomplishments she adds those of singing charming little songs and dancing the serpentine and other dances. She is only about 23½ inches tall and weighs only 14 pounds. She has her own gala turnout, which resembles a perfectly appointed doll's carriage.

PRINCESS TOPAZE—AGE 17, HEIGHT TWO FEET, WEIGHT 14 POUNDS.

Wire Wound Guns Adopted in the British Service.

Successful trials of the high powered 12 inch 46 ton wire wound guns, with which the new British battleships of the Majestic class are being armed, has directed special attention to this system of construction for ordnance.

Between the years 1875 and 1879 several wire wound guns were made by the Armstrong firm at Elswick, the largest being a 10 inch gun, and the designs were even prepared for manufacturing 110 ton wire wound guns. In 1883 a 10 inch wire gun was made at Elswick, and shortly afterward experiments were carried out in France with wire guns. The form of the wire used in that country, however, was circular in section, instead of rectangular, such as is adopted for the government service in England.

Of the early experimental guns, however, little was known outside professional circles until, in 1884, a 9·2 inch gun was made at Woolwich, and exhaustively tried in the years 1887 and 1888 This is the piece which is commonly known as the Jubliee gun, because of a series of experiments carried out in the jubilee year of her Majesty's reign for the purpose of ascertaining its extreme range. It was fired at an elevation of 45 degrees, and the range was then nearly 22.000 yards, or 12½ miles, and at an elevation of 40 degrees the range was a little more than 20,000 yards. Two successive shots at this great range fell within 30 yards of each other.

Experiments were continued with great success until 1890, when the employment of the system in making British service guns may be said to have regularly commenced, according to information furnished the Boston Herald by Charles N. Robinson, Commander Royal Navy. It has thus been little more than five years in practice, but at the present time many hundreds of guns so constructed are actually in use in the British land and sea service. These guns vary in size from the 12 pounder gun of six hundred weight, used by the horse artillery, up to the 12 inch guns, weighing 46 tons each, with which the new battleships are now being armed.

The system of wire winding a gun is exceedingly simple. A tube, or barrel, of steel is surmounted by a layer of steel hoops, or in the case of the 12 inch gun, by one single loop. Over this hoop steel wire is wound, the number of successive layers of wire varying in different guns from 9 to 78 layers in depth. The wire, or ribbon, is rectangular in section, and is wound on the barrel of the piece at an average strain of about 40 tons to the square inch. The strain actually varies with each successive layer, being greatest with the first layer and least with the last layer. To wind the wire the gun is put into an ordinary lathe, the wire having previously been wound on a large drum. This drum is passed over an elevated shaft, working automatically with the lathe and controlled by a brake. One end of the wire is secured to the gun by being passed under a ring of metal and screwed down. The lathe then being turned around, the wire is wound off the drum on to the gun. It is to be noted that the wire is not wound directly on the barrel, or inner tube, but on the hooping which covers it, although in the case of the 12 inch gun this hooping takes the shape of a tube as long as the bore of the gun itself. The end of the wire is secured in the same way as at the beginning, with a ring of metal, and these rings are afterward turned down to the level of the last layer of wire.

On each of the 12 inch guns of the Majestic class there is wound no less than 102 miles of wire, the dimensions of the wire being 0·06 by 0·25 of an inch. When the winding is completed, a layer of hoops is shrunk on, so that externally there is no difference in appearance between the wire gun and an ordinary gun. There is no other gun in which the wire principle has been carried to such an extent as in the new 12 inch gun, on which the wire is wound from one end to the other. In the lighter guns it is wound only over the chamber and to a point about half way down the bore, to support the maximum pressures.

The time occupied in the process of manufacturing a 12 inch gun has recently been considerably lessened. Before the system of wire winding became the custom the construction of a heavy caliber gun occupied from 14 to 16 months, but the 12 inch guns for the new battleships have been made on an average in less than 11 months, and 10½ months is now looked upon as the ordinary time for the manufacture of one of these enormous pieces of ordnance. Of this period at least four to five months are taken up in the preliminary operations of turning, annealing, and testing the forging.

The wire winding process in the case of a 12 inch gun will take from six weeks to two months, and the process of rifling nearly as long. This last named operation is one which it is impossible to hurry, as only one man can be employed in the delicate work, for each groove of the rifling has to be done separately, and there are 48 grooves to be cut.

The advantage claimed for the wire system, theoretically, is that, by judiciously regulating the tension at which the various layers are wound, it is possible to make the whole of the material of the gun take up its proper share of the strain at the moment of firing, when the pressures in the bore are at a maximum. Practically, it gives great transverse strength, so that a burst seems almost impossible where it is used, and the tension to which the wire is subjected during its acceptance trials and at the time it is wound on the gun insures every portion of the material used in this form being thoroughly tested, so that there is no fear of hidden flaws.

It has been contended that a shot striking a wire wound gun might burst the covering jacket and cut several turns of wire. It has, however, been proved in practice that wire is not so susceptible to damage as might be supposed. It has been found that when it breaks during the winding it unwinds itself very little, the friction between the parts being so great. Moreover, great care is taken to secure the end of the wire after every few turns, so that the danger which might arise if several of the layers were cut is much reduced, since, although the outer layer might be damaged, the tension of those underneath would not be affected.

The reason for the adoption of the wire wound system lies, no doubt, chiefly in the introduction of cordite (smokeless powder) charges, and also in the belief that the time must soon arrive when shells charged with high explosives will be fired from heavy ordnance. The enormous transverse strength given by wire is a property which, under these circumstances, might be of very great value.

Primitive Man.

At a special meeting of the Anthropological Institute, held in London, November 25, Dr. Eugene Dubois, from Holland, read a paper describing his explorations in Java, and gave a demonstration of the interesting fossil remains discovered by him during six years' residence there. Most attention was attracted by the remains of a human-like femur, an anthropoid skull, and two molar teeth found alongside various extinct species in a Pliocene stratum on the banks of a river in Java. As these specimens were found within an area of fifteen meters. Dr. Dubois considers that they all belong to one skeleton. He holds that these form the strongest evidence yet adduced in favor of the doctrine of man's progressive development along with the apes from a common progenitor; for he asserts that these indicate a transitional and intermediary form between man and the anthropoid ape, a creature measuring about five feet and a half in height, maintaining an erect posture, to which he has given the name Pithecanthropus erectus. The individual bones have given rise to much discussion in the scientific world since Dr. Dubois published a short monograph some months ago describing the find, and on Monday evening he related the various divergent opinions held by authorities who have examined the specimens. The femur presents all the characteristics of a human thigh bone, and, strange to say, shows rare pathological changes, myositis ossificans having affected the insertions of muscles on the upper third of the shaft. Dr. Dubois, however, thinks that he discerns some distinctive features, especially in the popliteal surface: this triangular space between the divergent supra-condylar lines is seen to be convex instead of being flat as in the human bone. Some of the anatomical authorities hold that this appearance is the result of the pathological process.

Whatever difference of opinion exists regarding the femur, the skull is quite unique, and approaches more nearly the simian type than the famous Neanderthal skull, being much more ape-like in the sinciput, the supraorbital ridges being very prominent, with a marked flattening over the frontal bones; but, on the other hand, its larger cranial capacity of about 1,000 c. c. places it higher in the scale than any of the known anthropoid apes. The teeth, the distinguished lecturer maintained, belong to the skull and are very human-like in appearance, but the wearing away of the surface of the crowns points more toward the ape than to Homo sapiens. After the demonstration many distinguished zoologists and anatomists took part in the discussion, including Sir William Flower, Sir John Lubbock, Sir William Turner, Professor Thomson, Dr. Garson, Mr. Sutton, Dr. Keith, and others. If Dr. Dubois' thesis be adopted, that these specimens belong to the same individual, then we are bound to admit the existence at an early period of an ape more anthropoid, or a man more pithecoid, than any remains have hitherto revealed, thus constituting an important link in tracing man back to an early form, which probably existed in the Archipithecus in the Eocene or Pliocene periods, whence he became differentiated from the simians, gorillas, etc. If, on the other hand, the bones belong to two individuals, then we have evidence of man being contemporaneous with an ape at a very early period, having a skull more resembling his own in form and capacity than any now existing. The truly scientific attitude is to wait for further researches by the paleontologists before we attempt to formulate our opinions.—Lancet.

How to Walk Upstairs.

"There are but very few persons who know how to walk upstairs properly," says a well known physician. "Usually a person will tread on the ball of his foot in taking each step, springing himself up to the next step. This is very tiresome and wearing on the muscles, as it throws the entire suspended weight of the body on the muscles of the legs and feet. You should, in walking or climbing stairs, seek for the most equal distribution of the body's weight possible. In walking upstairs your feet should be placed squarely down on the step, heel and all, and then the work should be performed slowly and deliberately. In this way there is no strain upon any particular muscle, but each one is doing its duty in a natural manner. The man who goes upstairs with a springing step you may be sure is no philosopher, or, at least, his reasoning has not been directed to that subject."