

**Tesla Says Roentgen Rays are Streams of Very Small Missiles.**

According to statements recently published, the Roentgen rays are now declared, by Nikola Tesla, to be material particles. Mr. Tesla states that the electrical conditions within the tube from which the rays issue produce absolute particles. He further says he can feel the effects of these particles striking against his eye, and has noted the sensation produced when they come in contact with his brain. He says:

"There is little doubt now that a cathodic stream within a bulb is composed of small particles of matter thrown off at great velocity from the electrode. The velocity probably obtained can be estimated, and fully accounts for the mechanical and heating effects produced by the impact against the wall or obstacle opposed to the bulb. It is furthermore an accepted view that the projected lumps of matter act as inelastic bodies, like innumerable infinitesimal bullets. It can be shown that the velocity of the stream may be as much as 100 kilometers a second, or even more. But matter moving with such great velocity must surely penetrate great thicknesses of the obstruction in its path. If the laws of mechanical impact are at all applicable to a cathodic stream.

"I have so much familiarized myself with this view that, if I had no experimental evidence, I would not doubt that some matter is projected through the thin wall of a vacuum tube. The exit from the latter is, however, the more likely to occur, as the lumps of matter must be shattered into still much smaller particles by the impact. From my experiments it appears that the lumps or molecules are indeed shattered into fragments or constituents so small as to make them lose entirely some physical properties possessed before the impact.

"The matter composing the cathode stream is," continues Mr. Tesla in his letter, "reduced to matter of some primary form heretofore not known, as such velocities and such violent impacts have probably never been studied or even attained before these extraordinary manifestations were observed. The important fact pointed out early by Roentgen and confirmed by subsequent researches, namely, that a body is the more opaque to the rays the denser it is, cannot be explained as satisfactorily by any other assumption than that of the rays being streams of matter, in which case such simple relation between opacity and density would necessarily exist.

"This relation is the more important in its bearing upon the nature of the rays, as it does not at all exist in light-giving vibrations, and should consequently not be found to so marked a degree and under all conditions with vibrations presumably similar to and approximating in frequency the light vibrations. An almost crucial test of the existence of material streams is afforded by the formation of shadows in space at a distance from the bulb. Such shadows could not be formed under the conditions described except by streams of matter."

**Music and Baldness.**

An English statistician has recently been engaged in an original task, that of studying the influence of music on the hair. The investigator establishes, in the first place, that the proportion of bald persons is 11 per cent for the liberal professions in general, with the exception of physicians, who appear to hold the record for baldness, which is 30 per cent. Musical composers do not form an exception to the rule, and baldness is as frequent among them as in the other professions. But it is with instrumental performers that the influence of music makes itself felt, and in two opposing directions. Thus, while stringed instruments prevent and check the falling out of the hair, brass instruments have the most injurious effects upon it. The piano and the violin, especially the piano, have an undoubted preserving influence. The violoncello, the harp, and the double bass participate in the hair-preserving qualities of the piano. But the hautboy, the clarinet, and the flute have only a very feeble effect. Their action is not more than a fiftieth part as strong. On the contrary, the brass instruments have results that are deplorable.

The cornet-a-piston and the French horn act with surprising surety and rapidity; but the trombone is the depilatory instrument par excellence. It will clear the hair from one's head in five years. This is what the author calls "baldness of the fanfares," which rages with special violence among regimental bands.

**THE MODERN REVOLVER—THE EVOLUTION OF A TYPICAL INVENTION.**

BY E. J. PRINDLE.

There is a popular impression that many inventions are produced in a complete and perfect state by one supreme effort of some genius. But, on inquiring into the history of even the most simple device which has been contrived for the use or pleasure of mankind, it will almost invariably be found that it had a most elemental and simple beginning, and that its growth from that state was by a series of short steps, each effected only after prolonged efforts and many failures,

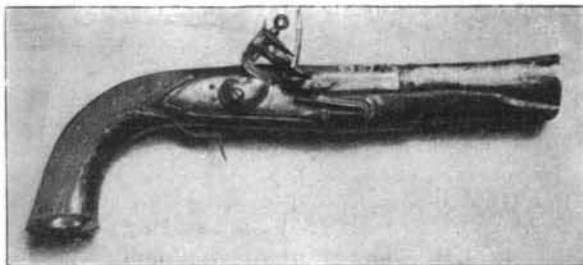


Fig. 1.—OLD FLINT LOCK PISTOL FOUND ON BATTLEFIELD OF NEW ORLEANS.

and that in many cases there were intervals of centuries between the steps.

The origin of the plow, for instance, is lost in antiquity, and, as far back as history goes, the Egyptians dragged the forked stick to till the earth and find a lodgment for the seed, and at best it was only a scratch that was produced. In spite of all the thought which was spent on the subject, it was not until the present century that the iron plow was created, and of such strength and form that it would dig down and overturn the sod and stand the blows of the rocks in its path.

Before the Christian era machinery operated by

produced that shown in Fig. 2, in which several barrels in the same plane were discharged in succession by a firing pin which was struck by the hammer and which was pointed at each cap in succession. But it was evident that a very cumbersome weapon would be produced if more than two or three barrels were used. To obviate this difficulty the barrels were grouped around a center and the hammer made to rotate around the circle step by step as each barrel was fired. This form is shown in Fig. 3.

Use, however, developed disadvantages in this form. It was difficult to put the caps on the nipples, and the hammer was necessarily of awkward and weak construction. Efforts to remove these defects resulted in the form of a revolver shown in Fig. 4. The barrels, still grouped around a center, were caused to revolve while the hammer remained stationary. This construction, however, was still unsatisfactory. The whole structure was necessarily weak, and there were six barrels extending the whole length of the pistol from the hammer forward.

Further efforts produced the modern revolver shown in Fig. 5, in which a rotatable cylinder carries the cartridges and is only of sufficient length to accommodate them. A single barrel carries the balls after they leave the cylinder, and the revolver is reduced to its highest, strongest and simplest form.

How infinitely greater would the chances be in favor of a man armed with the latest form of revolver compared with those of a man defending himself with the earliest type of pistol! With the latter but one shot was possible, and it was not at all certain that the charge would be fired when the trigger was pulled; while with the former six practically certain shots could be fired in most rapid succession.

Hundreds of inventors have striven for more than four centuries to produce a weapon having the advantages of the revolver in its present form, and each has added his mite to the final result. A full realization of the difficulties and labor with which each new fact is wrested from the unknown darkness and brought out into the light where it can be used, leads us to honor that perseverance and wisdom which puts us in the possession of any new thing.

**Aphasia in Polyglots.**

In a recent number of the *Revue de Medecine*, Dr. Pitres details a number of interesting observations with reference to the peculiarities of aphasia as it occurs among patients who were able to speak fluently more than one language. It appears that such patients do not become aphasic in the same degree for all the languages which they speak. At first, as a rule, there is general aphasia, then, as improvement occurs, the patient is able to understand and then to speak that language which he has known longest and with which he was most familiar. The capacity for use of the other less familiar languages was acquired later. Such a conclusion does not of course imply the existence of different centers for the different languages, but is merely an illustration of the fact that qualities and capabilities which are acquired latest are most easily lost or impaired by any condition which interferes with the nervous structures which underlie them.—*Lancet*.

**Prof. André to Return.**

Prof. S. A. André, according to reports received at Christiania on August 21, told Capt. Sverdrup, of the *Fram*, who visited the aeronaut, that it was now too late to make the proposed ascent, and that he would probably soon return to Spitzbergen, and make another effort to reach the North Pole in a balloon next April. This confirms the Berlin dispatches of August 18, which state that Sir William Conway met André on August 10, and that he was doubtful of success even then.

DR. J. WALTER FEWKES will again conduct explorations for the Smithsonian Institution among the Pueblos of Arizona. He left Washington for a three months' expedition, on May 30, accompanied by Dr. Walter Hough, of the National Museum.



Fig. 2.—MARSTON PISTOL IN UNITED STATES PATENT OFFICE.



Fig. 4.—ALLEN "PEPPERBOX" (CAP SHIELD DISPLACED).



Fig. 3.—LEONARD REVOLVER IN THE UNITED STATES PATENT OFFICE.



Fig. 5.—COLT'S ARMY REVOLVER.

steam was used to open the doors of temples and even to propel a deity on his throne along the ground. But it was two thousand years before the steam engine was produced in a sufficiently practical form to be generally used.

One of the clearest examples of this law of evolution in inventions is the principal part of the modern revolver; namely, the cylinder which carries the cartridges. Without reference to the other features of the revolver, notice how clearly the steps can be traced between the five forms ending in the modern revolver cylinder.

In Fig. 1 is shown the old single barrel, muzzle loading pistol. With this form but one shot could be fired without reloading, and a man after one shot was, in case of a failure, at the mercy of his enemy. The engraving represents a pistol found on the battlefield of New Orleans and now in the United States National Museum, Washington. The first step from this form