

ANCIENT EGYPTIAN VERSUS MODERN PIN LOCKS.

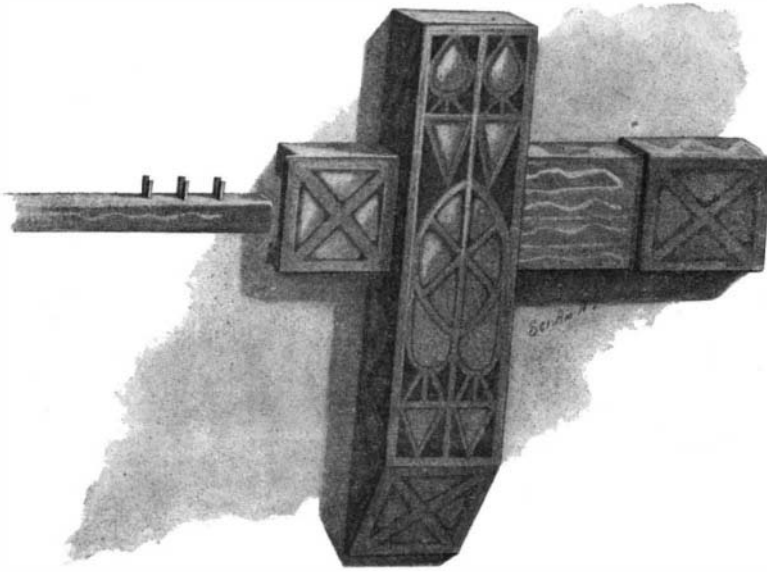
About as soon as the human race commenced to acquire property of any kind, it immediately began to devise safeguards for protecting its worldly goods from thieves. Homer mentions in his "Odyssey" a fastening to a door which resembles a leathern thong. This was placed in a hole in the door, the bolt of which was secured by means of a hook or ring attached to the thong. Often keys shaped like a simple crook were made of wood, as indeed many of the keys are still made in Oriental countries.

The earliest lock of which the construction is known is the Egyptian pin lock, which was used some 4,000 years ago, and, strange to say, the most perfect modern lock is based upon similar principles to those employed in the Egyptian locks. These locks are in use to-day in Egypt, and can be seen in any of the older streets of Cairo. Keys for Egyptian locks were and are thirteen or fourteen inches long, whereas the key of the gate of a public building was sometimes two feet in length. A great deal of importance was attached to these Oriental keys. They were the signs of authority and were carried on the shoulder of those who held any weighty office. The Egyptian lock, or "dabbeh," is placed on either the outside or inside of the door, and in a majority of cases they will be found on the outside.

Our engravings represent a typical Egyptian lock and the mechanism for working it. For our photograph of this lock we are indebted to the courtesy of Mr. H. H. Suplee, who kindly placed it at our disposal. The lock consists of two parts, the staple or locking device and the bolt proper, which slides back and forth, securing the door to the door jamb. The outside of these locks is often richly ornamented with inlaid pearl in Oriental designs, as in the present instance. The key consists of a block of wood in which a number of small iron pins, three, four, five or more in number, are secured. This key is thrust into a recess in the bolt, the rear wall of the recess limiting the lateral distance which the key can traverse. The key is raised and the iron pins pass through holes bored in the bolt and raise the pins of the locking device to a height which prevents them from interfering with the lateral motion of the bolt, so that if the right key is slipped in, the bolt can be moved forward and backward at will. The pins are provided with heads which prevent them from entirely slipping through the locking device and the bolt. The heads of the pins rise and fall in special channels provided for them. The

the Stausbury ward lock. This lock really had no wards or fixed obstructions, but it had a disk, and in the disk a series of holes, and in those holes are a number of pins forced forward by springs. The key has a number of pins on the end. The difficulty with this lock was that a blank key the size of the keyhole could be covered by wax, and by pressing it on the disk would show exactly where the pins are, and by this means another key could be made which would open the lock.

The most remarkable development of the pin lock is, however, what is known as the "Yale lock," which is an example of how the inventive American can take



VIEW OF ORNAMENTED EGYPTIAN PIN LOCK—FROM DAMASCUS.

a crude idea and make a remarkable invention from it. Linus Yale, Jr., who died in 1868, invented the Yale lock in the early sixties, and the fundamental patents have now expired. In its original form it had a thin, flat key, which, while affording great capacity for key changes, permitted the lock to be easily attacked by picking tools, although the lock did not yield readily. Subsequently the makers remedied this defect in a large measure by the invention of the corrugated key, and finally by perfecting what is known as the "Paracentric" key, which will be explained later on. The lock consists of a small barrel which turns in a cylinder in order to move the bolt.

The barrel is prevented from being turned by five divided pin tumblers which move up and down in the barrel and the cylinder. Each pin in the casing is forced down by a small spiral spring. The upper half of the pin in turn presses upon the lower half of the pin, which remains permanently in the rotatable barrel. When the key is out of the lock, the springs press the upper half of the pin down into the barrel, preventing it from turning and throwing the bolt. When the key is inserted, the pins are gradually raised until all of them in the cylinder are raised to the line between the barrel and the cylinder, while the lower half of the pin is also raised to the same point, permitting the barrel to be easily turned so as to throw the bolt. The key is provided with a beveled end, which enables it to be pushed under the pin tumblers so as to raise them easily. Should a false key be inserted, the steps would be too high or too low, so that some of the lower pins will be pushed up beyond the barrel into the holes above them, and the upper half of some of the other pins would undoubtedly drop so low as to also prevent the lock from turning. It will be seen at once that the same principle is involved in the Egyptian pin lock, and had invention stopped at this point, the lock would still have been a good one; however, Mr. Yale conceived the idea of making pins of different heights. This immediately caused the lock to be really safer than any other lock on the market. If only one pin was used, there would be 10 variations; with two pins there would be 100 changes; with three pins, 1,000 changes; with four pins, 10,000 changes; and with five pins, 100,000 changes. In other words, the number of changes which can be obtained with any number of pins can be figured by taking the power of 10 indicated by the number of pins; in other words, the number of pins would be the exponent of the figure 10. In practice it is found that about 30,000 changes are about all that is practical with a five-pin lock, owing to mechanical reasons. This alone would make the lock practically unpickable, but there is still another method of safeguarding it. The spacing of the different pins may be changed, and a single pin admits of another series of 30,000 keys, so that it will be seen that the lock is practically a safe one, as no thief could obtain anything like the requisite number of keys to attempt to open the lock.

Special types of locks are used for different purposes. Thus a post office may have Yale locks of a particular kind, and the company will not duplicate any key for this lock without an order from the proper authority. Should all the keys of a lock be lost, the lock can be taken off and sent to the factory; the length of the

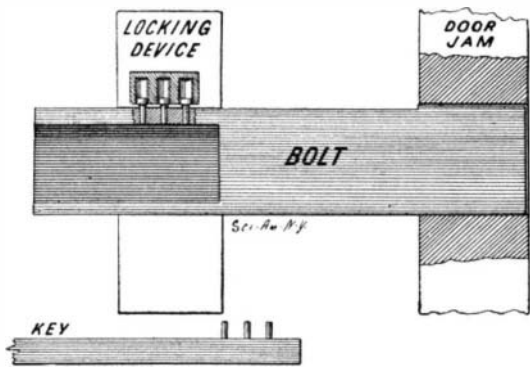
pins can be altered, and new keys made, so that the old keys will fail to operate the lock. It was found in practice that there was some danger of the lock being picked by instruments. The corrugation of the escutcheon and the passage in the movable barrel prevent this. Although the difference between the old and the new Yale lock is small in appearance, still there is little comparison between the safety of the two.

It is interesting to know that the Oriental used his pin lock for thousands of years without thinking of making an improvement which would make it comparatively safe, while it was reserved for the ingenious American inventor to take the clumsy old device and to transform it into a safe and remarkably interesting lock.

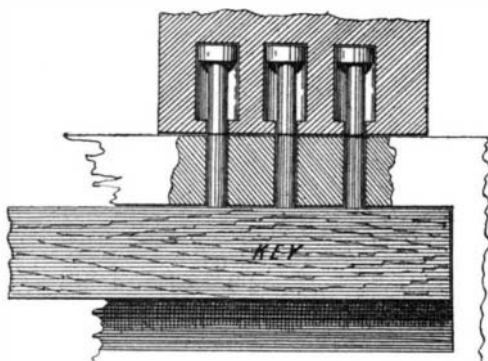
TURKEY is the last place where one would expect an exhibition, but even that country appears to have been struck by the wave of progress and the imperial government has decided to organize a permanent agricultural exposition in Constantinople. It will be installed in the premises of the Yildiz Relief Exhibition and will consist of two sections, one for cultivated plants and the other for domestic animals. Agricultural implements of the latest American type will be exhibited and the use of such machinery and implements will be taught to agriculturists by Americans who will be specially engaged by the government.

The Current Supplement.

The current SUPPLEMENT, No. 1235, has many articles of the greatest possible interest. The first page is occupied by an illustration showing three burning oil wells in the fields of Bibi-Eybat. "The Relations of Physics and Astronomy to the Development of Mechanical Arts" is by Prof. Cleveland Abbe. "The Theory of Sleep" is by Prof. A. L. Herrera. "The Recent Excavations of the University of Pennsylvania, at Nippur," by Prof. H. V. Hilprecht, is an illustrated description of explorations of the greatest interest, and the paper is admirably illustrated. "The Papyrus Plants of the River Cyane, at Syracuse," is an illustrated description of one of the most beautiful spots in Europe, the tasseled papyrus plants overhanging the clear stream Cyane; the papyrus plant grows nowhere else in Europe. "West Indian Hurricanes" is an original article by Dr. Eugene Murray-Aaron, and is of great importance owing to the recent devastation wrought by a hurricane in Porto Rico. It is accompanied by an illustrative map. "The Importance and the Promise in the Study of Domestic Animals" is a paper by Prof. Simon Henry Gage, of Cornell University, and is the opening address before the section of



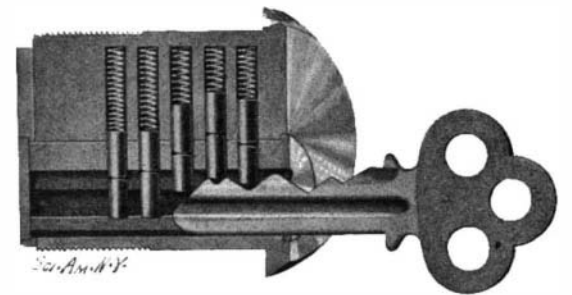
EGYPTIAN LOCK AND KEY, SHOWING BOLT LOCKED.



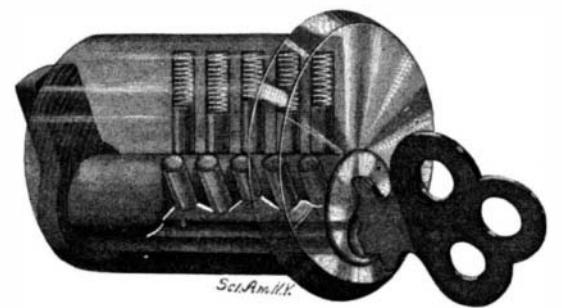
EGYPTIAN LOCK, SHOWING PINS FREEING BOLT.

pins in the key are all of the same height, and the pins, or pin-tumblers, as we may term them, for the locking device are also of the same height. By the insertion of a larger number of pins, and by arranging them irregularly in the locking device, the difficulty of picking the lock is increased. There is little trouble, however, for an expert to open a lock of this kind. If the picking instrument, as a bent wire, is inserted in the bolt, one of the pins could be raised, but the others would serve to hold the bolts securely; but if the front end of the bolt is seized and pushed and then the bent wire is used, the pins can be lifted one at a time and secured, the pressure on the bolt serving to bind them when they have been raised. One pin is taken at a time, while the pressure is on, until the last pin is raised, then back slides the bolt.

The same principle is carried out in what is called



YALE LOCK WITH KEY PARTLY INSERTED.



KEY FULLY INSERTED RAISING PINS TO UNLOCKED POSITION.

zoology of the American Association for the Advancement of Science at their Columbus meeting.

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(Illustrated articles are marked with an asterisk.)

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