## THE INVENTIONS OF ARCHIMEDES.

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displaced more of the fluid than the gold had done, and less than the sliver; by which he inferred that the crown was neither pure gold nor pure sliver, but a mixture of both. Hiero was so gratified with this result, as to declare that from that moment he could never refuse to believe anything Archimedes told him.

Travelling into Egypt, and observing the necessity of raising the water of the Nile to points which the river did not reach, as well as the difficulty of clearing the land from the periodical overflowings of the Nile, Archimedes invented for this purpose the screw which bears his name. It was likewise used as a pump to clear water from the holds of vessels; and the name of Archimedes was held in great veneration by seamen on this account. The screw may be briefly described as a long spiral with its lower extremity immersed in the water, which, rising along the channels by the revolution of the machine on its axis, is discharged at the upper extremity. When applied to the propulsion of steam-vessels, the screw is horizontal; and, being put in motion by a steam engine, drives the water backwards, when its reaction, or return, propels the vessel.

The mechanical ingenuity of Archimedes was next displayed in the various machines which he constructed for the defence of Syracuse during a three years' siege by the Romans. Among these inventions were catapults for throwing arrows, and balistæ for throwing masses of stone; and iron hands or books attached to chains, thrown to catch the prows of the enemy's vessels, and then overturn them. He is likewise stated to have set their vessels on fire by burning-glasses; this, however, rests upon modern authority, and Archimedes is rather believed to have set the ships on fire by machines for throwing lighted materials.

After the storming of Syracuse, Archimedes was killed by a Roman soldier, who did not know who he was. The soldier inquired; but the philosopher, being intent upon a problem, begged that his diagram might not be disturbed; upon which the soldier put him to death.

To Archimedes is attributed the apothegm: "Give me a lever long enough, and a prop strong enough, and with my own weight I will move the world." This arose from his knowledge of the possible effects of machinery; but however it might astonish a Greek of his day, it would now be admitted to be as theoretically possible as it is practically impossible. Archimedes would have required to move with the velocity of a cannon-ball for millions of ages to alter the position of the earth by the smallest part of an inch. In mathematical truth, however, the feat is performed by every man who