

the energies of the engineer in peace time were only turned to unproductive and monumental works.

Perhaps the earliest civil engineering works now in existence are ancient canals and irrigation works;—we read of a celebrated Chinese engineer named Yü who was engaged in canal building in B.C. 2,200, and we know that there were very ancient irrigation works in connection with the Nile and its annual flood.

Probably the oldest military engineering work now extant is the great wall of China;—similar to this, but following thousands of years after, are the Roman walls built from sea to sea across the north of England, to keep off the invasions of the Picts and Scots.

Many of the greatest military engineering works of old have from the nature of things disappeared, such as the bridge of boats built by Xerxes across the Hellespont, the damming of the River Euphrates at Babylon to effect an attack of the city along the dried river bed, the ignition of the besieger's ships at Syracuse with burning-glasses by Archimedes and his lifting of the same ships by huge cranes.

The earliest road making was for military purposes,—perhaps the best known (though not the most ancient) example of which is the Roman roads in Great Britain; the peculiarity of these roads is, that they run often in a perfectly straight direction for many miles, ignoring hills. They are still in many cases in use, and retain their ancient names, such as Watling Street, Fosse Way, &c.

As in the case of the Chinese and Egyptian civilizations, the first example of civil engineering on the part of the Romans took the form of hydraulic works and aqueducts, and are in many places still in existence.

But one might almost say that civil engineering is the growth of the last century;—up to that time the word "engineer" meant military engineer, and when Shakespeare said

"'Tis sport to see the engineer, hoist by his own petard,"
it was not necessary for him to qualify the word.

The engineer in Shakespeare's time was engineer and artilleryman in one,—he managed the engines of war, which then used gunpowder instead of the more primitive propelling forces of the catapult, and he blew in the gates of a town or castle with a petard instead of using the more primitive battering ram. In those days the word "artillery" was applied to the art of the archer, as will be seen in the authorized translation (date about A.D. 1,600) of the Bible (story of David and Jonathan).