

Engineering-----Ancient and Modern

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SUMMARY

The purpose of this thesis is to compare some of our modern engineering feats with those of the ancients. Thus there existed in the pre-Christian era industries that supplied imitations of things too expensive for the common people, such as metallic alloys resembling gold and silver, artificial pearls, and other artificial jewels made from glass. Also, that as far back as 1000 B.C. the smelting, forging, and casting of metals was successfully practiced. The Egyptians successfully solved the problem of flood control in the Nile Valley, while today we have not done too well with our Mississippi River project. The Egyptian pyramid are readily comparable with our modern structures. We also find many practical devices containing the so-called modern machine elements, such as wedges, levers, pulleys, toothed gearing, etc. The distillation of crude mineral oil was known as far back as 3 B.C. Machines similar to our chewing gum and cigarette vending machines were found in Egyptian temples for dispensing ceremonial water. Ingenious and modern sounding as these early devices are, they differ from our modern engineering projects in that they take no account of power. These systems employed slave labor, and this meant untold suffering and labor for the slaves. Although our engineering achievements have been great, they are more than paralleled by our social advancements.

BIBLIOGRAPHY

"The Scientific Monthly", November, 1939

"Architecture Through the Ages", Talbot Hamlin

G.P. Putnam's Sons, New York, N.Y.

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Recently we have indulged in much back-patting and self-congratulation on our modern engineering progress. Let us go back a few thousand years to see what we have that the ancient peoples lacked. In general we will find that most ancients had a large number of products that we think of as modern. For example, there are now large industries making boards from cornstalks, artificial silk from wood, automobile steering wheels from soya beans, and so on. In the pre-Christian era there existed industries which supplied imitations of things too expensive for the common people, such as metallic alloys resembling silver and gold, artificial pearls, and other jewels made from glass.

Suppose we hastily review the knowledge of ancient peoples to evaluate their possibilities in engineering achievements. Copper and bronze were used before written history, but about 1000 B.C. were replaced by iron. Homer in the Odyssey mentions about hardening iron by quenching, and in the Iliad he gives a vivid picture of armor making, using fires, bellows, tongs, hammer, and anvil. Some idea of the prevalence of iron in 700 B.C. is given by the discovery of 176 tons of rectangular iron billets in the storehouses of the Assyrian king Sargon II.

Flood control sounds like a modern problem, at which we have not done too well----witness the 1937 Mississippi

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River flood. Herodotus, a Greek visiting Egypt in 430 B.C., describes a successful flood control and irrigation system in the Nile valley which was begun in 3400 B.C.

The Greeks were the first people to contribute largely to scientific and engineering theory. By 200 B.C. plane and solid geometry was pretty well worked out, the laws of levers and center of gravity understood, and something was known of relative density and hydrostatic pressure.

At the end of the pre-Christian era, we find more attention paid to practical devices containing the so-called modern machine elements, such as wedges, levers, pulleys, toothed gearing, and etc.

There are many more instances of ancient use of modern discoveries and reinventions. Theophrastus (third century B.C.) describes coal and its combustion. Dioscorides (first century A.D.) mentions the distillation of crude mineral oil to obtain different grades of oil. Apparently our modern petroleum industry had its beginning at least 1900 years ago. We think that certainly our chewing gum and cigarette vending machines must be new, but Hero describes a device for dispensing water in Egyptian temples by putting money in a slot.

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Ingenious and modern sounding as many of these early devices are, they differ from our modern engineering projects in that they take no account of power. The ancients employed cheap and easily available slave labor, which could produce about one tenth horsepower per head. While this system was all right for the ruling classes it meant untold labor and suffering for the slaves. Great as have been our advances in science and engineering, they have been more than paralleled by our social advancement. And perhaps if the ancient engineers could come to life today, would be most surprised to see instead of a sweating and groaning slave, his equivalent of 75 watts of electricity, which can be purchased at the rate of two fifths cents per hour.