

totally unfitted for defending the interests of the engineers, which, by the Government attempts, are the most threatened. The delegates are all from railways which have their bills, and most of them from finished lines. Chairmen of companies of course care nothing about how the engineers are likely to be interfered with, neither do the directors of finished railways care one straw about what measure is meted out to the projected lines; on the contrary, they would willingly give every aid, as they have shown, towards casting obstacles in their way. Narrow or broad gauge, six or four wheeled engines are nothing to directors, but they are great things to engineers, who are not likely to be best pleased with the exercise of their profession, when it is to be ruined by being placed under [the tampering knick-knackery of a railway inspector, who entered on his duties ignorant of the works he was called on to inspect, and who has distinguished himself ever since by his disposition to foist his own crotchets, in opposition to the experience of other men. Although Sir Frederick Smith does not claim the power of meddling with engineering details at present, he evidently reserves it, and we have, in the report of the horse marine steam-boat inspectors, a pretty good inkling of the kind of interference which they ultimately look forward to. We have seen one difference of opinion already, and we ask what farther we have to expect from the forbearance of the government jobbers. A pretty pass affairs have come to in the profession, when the Stephensons, Brunel or Locke, are to knuckle down in their own department to a military engineer, to come like petty schoolboys and recite their tasks to a dabbler in the art, themselves have created. The statues of Smeaton, Watt and Telford, may tremble on their pedestals at this insult to their successors. What tribunal would be called upon to decide if men at the head of the law or medical profession entertained a doubt? Is there any tribunal? We think there is none. The government would think otherwise; the course they would adopt would be to send the Lord Chancellor or Lord Denman, Sir James Clarke or Sir Henry Halliday, to some one in the lowest ranks of their professions. We consider the interference of the government with engineering, as a gross insult to the profession. They would not refer the fortification of Chatham to us, why then should military engineers be sent to interfere with railways?

It is the eleventh hour, but we call again on the engineers to come forward, and to resist these encroachments ere it be too late. Government cares nothing for their interests, neither do railway directors, so that the only way engineers have of protecting them, is by protecting them themselves. The injury threatened by the government is very great, no one can tell the greatness of its extent, for one successful attack upon the liberties of the profession cannot fail to lead to farther inroads. Let the engineers do as the marine engineers did last year, and as they mean to do this, unite, and we have no doubt that the jobbers will be defeated. If, however, they like to be under the dominion of the one-tailed bashaw in Whitehall, they will remain supine and allow themselves to be sacrificed. We call upon them therefore to lose no time in organizing an opposition. The Institution of Civil Engineers we feel are particularly called upon, and we consider that they will grossly neglect the interests of the profession if they do not immediately send a petition to both Houses of Parliament, praying that no government interference with the profession may take place. The engineers generally should also meet, and send similar petitions, and a committee should be formed to oppose the bill at its future stages.

ENGINEERING WORKS OF THE ANCIENTS, No. 3.

MINES OF THE THASIANS.—SIPHNIANS.—ATHENIANS.

Continuing our extracts from Herodotus, we find that the Thasians derived considerable wealth from their mines. From those of gold at Scaptesyra they obtained upon an average eighty talents; Thasos itself did not produce so much; but they were on the whole so affluent, that being generally exempt from taxes, the whole of their annual revenue was two hundred, and in the times of the greatest abundance three hundred talents. It may be observed that many of the Greek states derived considerable revenues from mines, which admitted of the application of slave labour on a large scale. So with some of our modern states mining and mining monopolies are important sources of income. Of the Thasian mines, Herodotus remarks, that he had seen them, the most valuable were those discovered by the Phenicians, who also were engaged in the Cornish tin trade, and in working the mines of Spain. The Phenicians are stated by our author to have first made a settlement on the island under the conduct of one Thasus, and to have named the island after him. The mines so discovered were be-

tween a place called Ænyra and Cœnyra. Opposite to Samothracia was a large mountain which by the search after mines was effectually levelled, from which it is evident that the working was surface working. The Thasians also, according to the testimony of Thucydides, had some valuable mines on the coast of Thrace. If the mining of the Thasians was confined to surface-working, it could scarcely be from want of a knowledge of other modes, as we shall see by the example of the Samians that tunnelling was carried on upon a large scale. The Siphnians were also a mining people, their soil producing both gold and silver in such abundance, that from a tenth part of their revenues, they had a treasury or cash-box, as we should call it, in the general bank of Greece at Delphi, equal in value to the richest which that temple possessed. Their power was consequently considerable, and they were at one time the richest of all the inhabitants of the islands, although their territory was but small, being one of the seventeen small islands opposite Attica, called the Cyclades. This isle is now called Siphanto, and although it no longer has mines of gold and silver it still has plenty of lead, which the rains discover. The Siphnians every year made an equal distribution among themselves of the produce of their mines, as did the Athenians of that of the silver mines of Attica. In allusion to stream-works, Herodotus says that the Indians obtained great abundance of gold, partly by digging, and partly from the rivers. Of the Ethiopian gold our author speaks, but does not say how it was obtained. Tin is mentioned as being obtained from the Cassiterides, supposed to be the Scilly Isles, of which Herodotus says that he has little information.—The north-west of Asia is represented as abounding with gold, but how it was obtained was not known. This passage might refer to the mines of the Ural.

WORKS OF THE SAMIANS.—TUNNEL.—AQUEDUCT.—MOLE.—ENGINEERS.

The Samians were distinguished among the Greeks for their engineering monuments, for which very reason Herodotus says that he was particular in his account of those islanders. Of these works, remains to this day exist. Through a high mountain they are said to have cut a passage, seven stadia (about a mile) long, eight feet high, and as many wide. By the side of this was a canal or aqueduct three feet in breadth, and twenty cubits, according to our author, in depth, but in this there must be some mistake.—In this canal pipes were laid conveying to the town the water of a copious spring, supposed to be that of Metelinous. Another work is the Mole now forming the left horn of Port Tigrani. According to Herodotus, it was two stadia or more in length, and twenty orgyia or cubits in height. The engineer of the tunnel was Eupalinus, the son of Naustrophus, and an inhabitant of Megara.

TRENCH OF THE SCYTHIANS.—WALLS—BRIDGES.

The descendants of the slave population having revolted against the Scythians, intersected the country with a deep trench, supposed to have separated the Crimea from the mainland. In the time of the Emperor Constantine Porphyrogenitus this was filled up, it must however have existed for a long period. In Scythia are also mentioned bridges and walls constructed by the Cimmerians.

POLYBIUS.

CARTHAGINIAN ENGINEERING.—BRIDGE OVER THE MACAR.—NEW CARTHAGE CANAL.—GOD OF MINING.

From Herodotus we come to Polybius, but it is to be regretted that the latter has rather applied himself to accounts of political intrigues than the descriptions of the physical features of the countries on which he writes. From him therefore we are enabled to glean but little information, and that of a most discursive character. He gives several hints showing us the capacity of the Carthaginians for engineering, but he has not entered into those explanations which would have come with weight from him as an eye witness. The passage of the Alps, by Hannibal, is sufficient to prove the skill of the Carthaginians, but we have too vague a description of the mode of proceeding to allow us to profit by it.

In the 1st book chapter 6, a singular account is given of a bridge near Carthage, which was laid over the Macar, a deep and rapid river, scarcely fordable in any part. This was the only bridge on the river and formed one of the passes to Carthage. On it Polybius states that a town was built by the soldiers and used as a garrison. The roads in the neighbourhood of Carthage were mostly made by great labour.

In their military operations the Carthaginians were well accustomed to pass rivers, instances of which we have in the course of Hannibal's expedition.—His passage of the Rhone belongs rather to military tactics, but there is one point to which we think it necessary to allude, as it may be of interest to our bridge engineers. Having formed a