

Congress, perhaps with his case in mind, passed an act, on April 4, 1800, by which, on the petition of his creditors, a man might be adjudicated a bankrupt and released from prison. After various disagreeable scenes Morris was released, with unpaid debts amounting to three million dollars. He spent the last five years of his life in a small house which Mrs. Morris was able to maintain from a small income which had been settled upon her through the efforts of her husband's friend, Gouverneur Morris. So ended in obscurity the career of "the patriot, upon whom all the other patriots of the Revolution had depended," a victim equally to his own sanguine temperament and a freak of fortune.

The Story of Asphalt

A PAMPHLET published by Warren Brothers Company which tells the story of the past eighty years' development of a very old industry, has been presented to the Society by Mr. George C. Warren. Although the use of asphalt for paving purposes is generally thought of as a nineteenth-century invention, it is, as a matter of fact, older than Nebuchadnezzar. An inscription on a brick found on "Procession Street," which led from the palace to the North wall, states that Nebuchadnezzar's father, Nabopolassar, King of Babylon, "had made a road glistening with asphalt and burnt bricks," and that he, "Nebuchadnezzar, King of Babylon, he who made Esaglia and Ezida glorious, placed above the bitumen and burnt bricks, a mighty superstructure of shining dust, made them strong within with bitumen and burnt bricks as a high-lying road."

"This," observes Herbert Abraham, in his *Asphalt and Allied Substances*, "would seem to be the forerunner of the present-day pavement composed of stone blocks set in asphalt."

Nebuchadnezzar reigned from 604 to 561 B.C. Asphalt appears in relics of a much earlier age. The first recorded use of it was by the Sumerians, the pre-Babylonian inhabitants of the Euphrates Valley. These people seem to have been skillful in stone carving, and their pottery and statuary is sometimes decorated with shells or bits of stone cemented with asphalt as a sort of mortar.

Dr. E. J. Banks, excavating in 1903-4 at Adab (sometimes known as Bismya), in Syria, between the Rivers Euphrates and Tigris, found, among other things, a marble statue of Lugal-daudu, King

of Adab, one of the early Sumerian rulers. The hollow eye-sockets show the presence of asphalt, indicating that they were once inlaid with some substance, probably mother-of-pearl or ivory. Another statue of the same period, known as the "Human Headed Bull," dating about 3000 B.C., is made of black steatite, and striped with bands of little yellow shells, held in place with asphalt.

Many passages in the Old Testament would seem to refer to asphalt. It is suggested in Mr. Abraham's work that the "pitch" with which Noah reinforced the ark may have been asphalt. In describing the Tower of Babel, supposed to have been built about 2000 B.C., the chronicler says, "and they had brick for stone, and slime had they for mortar." By "slime" he undoubtedly meant asphalt, for it appears in the Vulgate as "bitumen." And the basket in which Moses was set adrift among the bulrushes was daubed "with slime and with pitch."

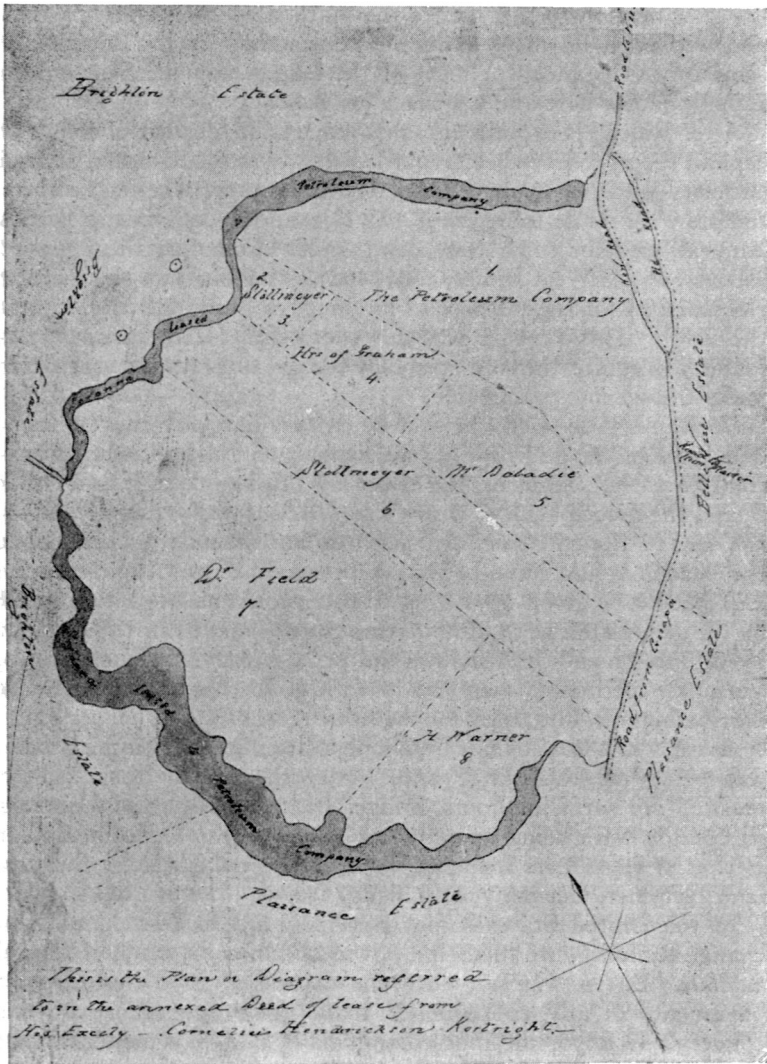
The suppositions as to the use of asphalt in biblical times are borne out by the fact that a supply of it was readily accessible. It was undoubtedly obtained from the Dead Sea, where it rose, from time to time, to the surface and floated ashore.

Besides being used for building, paving and calking purposes, asphalt performed another interesting function in the ancient world, that of preservative for the bodies of dead Egyptian rulers. The body was first wrapped in cloth, and then coated with asphalt. The words for "asphalt" and "mummy" were at one time synonymous. In about 100 A.D. Pliny the Elder, writing his "Naturalis Historia" at Rome, recommends the use of it for curing everything from blindness to epilepsy, explaining its curative properties by the fact that it had preserved the dead for so many centuries.

"It was sold extensively under the name of 'mummy,'" says Mr. Abraham, "and we are informed that the asphalt used was actually scraped from the mummies taken from tombs."

Like many of the ancient arts, that of paving and building with asphalt as a cement was lost during the middle ages. If Columbus, when, on his third voyage of discovery in 1498, he came to the shores of Ière, the land of the hummingbird (which he named Trinidad for its three peaks), had penetrated far enough to find the hundred odd acres of solidified asphalt which forms the famous "Pitch Lake," he would have looked on it merely as a curiosity.

When Sir Walter Raleigh landed at Trinidad nearly a hundred years later, in his search for El Dorado, he is said to have had his ships coated with asphalt from the "lake." A writer who had spent



PLAN OF THE EIGHT ORIGINAL LEASES UNDER WHICH CONRAD STOLLMAYER AND SEVEN OTHERS WERE PERMITTED TO "WIN" ASPHALT FROM THE "PITCH LAKE." THE STOLLMAYER LEASE WAS LATER TAKEN OVER BY BARBER AND WARREN COMPANIES

many years on the island observes that he must have taken it from the spot near the center where the material is comparatively soft, and worked it down to a thinner consistency by the addition of some oily substance, for most of the lake is now solid enough to support motor cars and a surface railway.

After Raleigh's experiment, this remarkable deposit of solidified asphalt seems to have been regarded simply in the light of a natural curiosity until early in the nineteenth century, when several attempts were made to utilize it. Sir Alexander Cochrane, a British admiral, and for some time commander-in-chief of the Leeward Islands, of the West Indies, conveyed to England two shiploads of the material for the purpose of pitching, or "paying" the ships of the navy. This venture was not successful, for the asphalt was found to require the admixture of too great a quantity of oil to make the scheme practicable.

Sir Ralph Woodford, the first British civilian Governor of Trinidad, used gas made from the lake asphalt for the lighting of a beacon, which he placed on the tower of Trinity Church at Port of Spain, the principal city. Stark's *Guide-Book and History of Trinidad* tells us that the gas burnt brightly and steadily, and no doubt the beacon would have become a permanent institution, but the idea had to be given up, owing to the intolerable stench given off by the gas. Later, good illuminating gas was made from the asphalt by an American scientist, but the process proved too expensive. Various experiments were made with it for the manufacture of lubricating oils, but failed for the same reason.

As early as 1802, asphalt from a deposit at Seyssel, on the Rhone, was being marketed in France under the name "rock asphalt mastic," for surfacing floors, bridges and sidewalks; and footpaths in London were being made of asphalt in 1836. Deposits similar to that at Seyssel are found at Val de Travers, Neuchatel, Switzerland; Limmer, Germany; and Sicily, Italy.

In the United States a foot pavement in the Merchants' Exchange Building, in Philadelphia, was laid in 1838, made of Seyssel asphalt. But it was not until the decade of 1870 that asphalt pavements of any consequence made their appearance in this country. In 1876, the first commercially laid pavements of that material were constructed not far apart on Pennsylvania Avenue, Washington, D. C. The material used for one was asphalt from Neuchatel, and for the other from the "lake" at Trinidad. It is with this chapter of the story that Mr. Warren's pamphlet deals.

Although up to the year 1883 the exportation of asphalt did not total over a few thousand tons, a few men with vision ahead of their times, were working the Trinidad deposit under eight leases, executed by the British government and that of the colony of Trinidad, in 1869. These leases, all to individuals, were to run twenty-one years. Under any one of them, the whole lake might be exhausted of its asphalt, owing to the semi-viscous character of the material, provided a market could be found for it, and the means to carry it away. This contingency, however, was at that time exceedingly remote. The complete ignorance of the commercial possibilities of asphalt which prevailed at the time is shown by the fact that a very valuable strip about 400 feet wide, running through the center of the "lake," and the length of it (about half a mile), was leased to one Conrad F. Stollmeyer for the equivalent of about \$36.50 a year.

In 1883, E. Burgess Warren of Philadelphia, acting in behalf of himself and brothers and the Barber Asphalt Paving Company, The Warren Chemical and Manufacturing Company, and the prospective Warren-Scharf Asphalt Paving Company, concluded an assignment of this Stollmeyer lease. At about the same time the interests of all the "Trinidad Pitch Lake" leaseholders were united under the leadership of Amzi L. Barber, and a new long-term lease was made with the British and Trinidad Governments for the exclusive right to "win" and sell asphalt from the "lake," under a greatly increased rental and export duty, and, for that period, a large annual guaranteed production of twenty thousand tons, resulting in substantial income to the Trinidad Government. After that, the asphalt paving industry in America began to assume commercial successful proportions.

There have been varying descriptions of this curious deposit, ranging from the accurate to the fanciful, for the name "Pitch Lake," and the form that gave rise to it appeal to the imagination of travellers. Actually the so-called "lake" is the result of the gradual filling up of a depression or crater of an unknown depth in a mountain near the shore of Trinidad, at the present town of La Brea. The original formation must have been of an oily nature, from which the lighter particles evaporated leaving hard asphalt which gradually filled the crater. Asphalt is still forming at the center of the "lake," and in fact the whole "lake" is in slight, imperceptible motion, leaving the surface a series of convex areas with water forming small, shallow brooks between them. In places,

loam has collected and bushes have grown up. The outer edge of the "lake" is covered with wild trees and shrubs.

As the asphalt is excavated for commerce, the opening fills in a day or so from the flowing of the material at the sides. For years, the Trinidad "lake" was the only source of asphalt in America. Notwithstanding, however, the immense tonnage which has been removed in the last fifty years, the level of the surface is approximately the same from year to year, again showing that material is continually forming at the bottom. Indeed, before the commercial production of asphalt had gained headway, that from the surface of the "lake" flowed over the shores, down the hill as far as the town of La Brea, and into the ocean.

The natural features of the place, however remarkable, pale before the descriptions brought back by romantically minded travelers. One Joseph, after telling of the approach to the "lake," and the grayish look of the surface in fine weather, proceeds:

"It is time that I conducted my readers toward the more active part of the lagoon. In order to do this we must approach from the side nearest to the sea. Here we encounter streams of petroleum slowly but perceptibly flowing. Let us advance with caution; as we sink ankle deep at each step, let us pause, there would be danger in advancing further; behold these fountains which supply all these rills of petroleum; no man can venture near, that is the capital of the Demon of the lake Asphaltum, the Phlegethon of this subterranean Tartarus."

Although the place would undoubtedly prove a disappointment to sightseers who expected anything of the infernal character described above, and although natural asphalt has in part been displaced by that manufactured from asphaltic oils in various parts of North and South America, the "Pitch Lake" is a phenomenon of great interest, and still plays its part in a highly important and still growing industry.